

حمل الآن

مجاناً وحصرياً

المراجعة رقم (1)

اختبار شهر اكتوبر



Questions

Unit 1 | Lesson 1

Answered

Hydrosphere on Planet Earth

Interactive
test



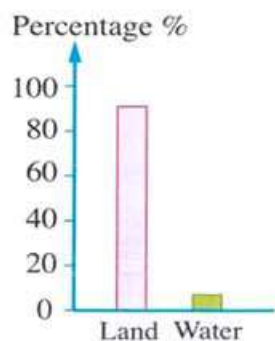
First

Multiple Choice Questions

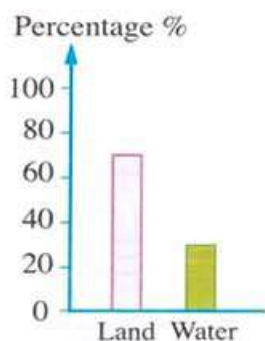
Questions signed by * are answered in detail.

Hydrosphere

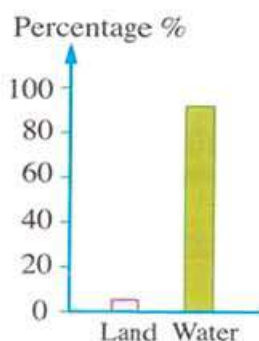
- 1 Which of the following **doesn't** represent an ecosystem?
(a) The great desert. (b) Amazon rainforest.
(c) Atmosphere. (d) Salty lakes.
- 2 The ratio of frozen water to liquid fresh water on the planet Earth is
(a) $\frac{1}{2}$ (b) $\frac{2}{1}$ (c) $\frac{3}{1}$ (d) $\frac{1}{1}$
- 3 What is the direct source of fresh water on the Earth's surface?
(a) Oceans. (b) Seas. (c) Salty lakes. (d) Rivers.
- 4 What are the states of matter at which water exists in the spheres of planet Earth?
(a) Solid and liquid only. (b) Solid, liquid and gaseous.
(c) Solid and gaseous only. (d) Liquid and gaseous only.
- 5 What is the percentage that oceans, seas and salty lakes represent from the total percentage of water covering the Earth?
(a) 70% (b) 97% (c) 3% (d) 30%
- 6 Which of the following represents the largest source of water on the Earth's surface?
(a) Oceans. (b) Fresh lakes. (c) Groundwater. (d) Glaciated rivers.
- 7 Which of the following graphs represents the percentage of water and the percentage of land on the Earth's surface?



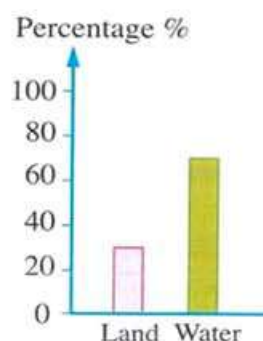
(a)



(b)

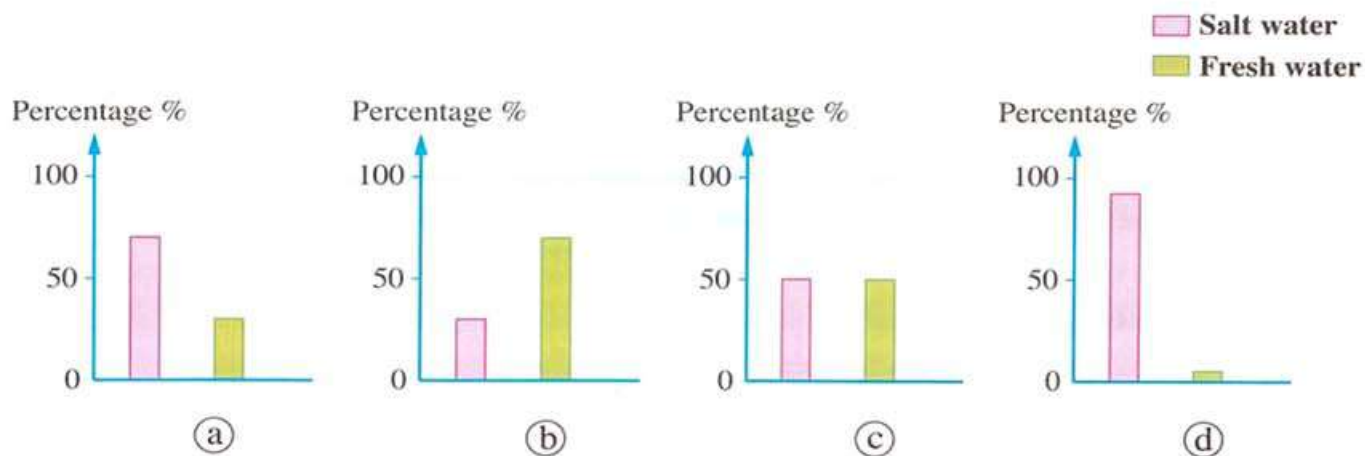


(c)



(d)

- 8 Which of the following graphs represents the water distribution approximately in the hydrosphere of Earth?



Water cycle in nature

- 9 Transpiration and respiration are vital processes that contribute to the hydrological cycle. Which choice in the following table correctly represents them?

	Transpiration occurs in	Respiration occurs in
(a)	Plants only	Plants and animals
(b)	Plants only	Animals only
(c)	Plants and animals	Plants and animals
(d)	Animals only	Plants and animals

- 10 Which of the following processes may be a direct source of groundwater?

- (a) Water evaporation. (b) Respiration in human.
(c) Transpiration in plants. (d) Infiltration.

- 11 The water cycle in nature is known as cycle.

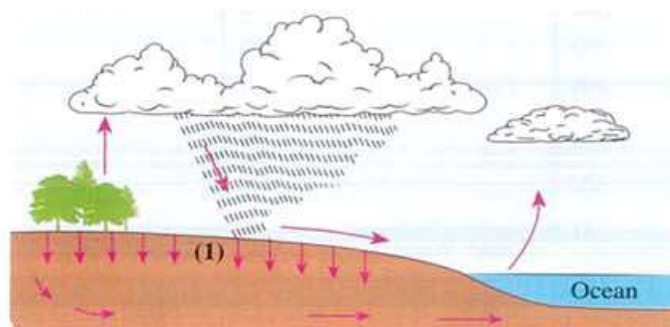
- (a) hydrogen (b) geological (c) biological (d) hydrological

- 12 How does water return directly from land to oceans?

- (a) By evaporation. (b) By flowing.
(c) By condensation. (d) By volatility.

- 13 The opposite figure represents a part of the water cycle in nature. So, process no. (1) participates in

- (a) rain falling
(b) groundwater formation
(c) clouds formation
(d) snow falling



- 14 What is the direct role of transpiration process in the hydrological cycle?
 (a) Infiltration through sedimentary rocks.
 (b) Condensation of water vapor forming clouds.
 (c) Increasing CO₂ gas percentage in the atmosphere.
 (d) Increasing the water vapor percentage in the atmosphere.
- 15 * Which of the following statements isn't applied to the water cycle in nature?
 (a) It includes water movement through many pathways.
 (b) Living organisms have a role in its continuity.
 (c) It keeps the constancy of the Earth's surface.
 (d) It represents a nearly closed system.
- 16 * What is the process that occurs to the output of transpiration during the hydrological cycle?
 (a) Evaporation. (b) Infiltration. (c) Falling. (d) Condensation.
- 17 Stomata are present in
 (a) roots (b) leaves (c) flowers (d) fruits
- 18 What is the biological process that the animals perform and share through it in the water cycle in nature?
 (a) Respiration. (b) Transpiration. (c) Photosynthesis. (d) Growth.
- 19 * Which of the following processes is opposite to the condensation process in the water cycle in nature?
 (a) Water infiltration through the soil pores.
 (b) Evaporation from water bodies.
 (c) Rain falling.
 (d) Ice melting.
- 20 Which of the following processes doesn't result in increasing the percentage of water vapor in the atmosphere?
 (a) Transpiration in plants.
 (b) Water infiltration through sedimentary rocks.
 (c) Animals respiration.
 (d) Seawater evaporation.
- 21 Which of the following isn't from the nitrogenous wastes?
 (a) Ammonia. (b) Nitrogen gas. (c) Urea. (d) Uric acid.
- 22 As the number of plant leaves increases, the rate of transpiration
 (a) increases (b) decreases (c) vanishes (d) isn't affected
- 23 Which of the following factors doesn't affect the transpiration process?
 (a) Number of plant leaves. (b) Number of flowers and fruits.
 (c) Soil humidity. (d) Atmospheric temperature.
- 24 In which of the following periods of time, the rate of transpiration increases during the day?
 (a) At early morning. (b) At noon.
 (c) At sunset. (d) At evening.

Second**Miscellaneous Questions****1 Write the scientific term for each of the following statements:**

- (a) Everything surrounds us including biotic components and abiotic components.
- (b) A community of living organisms interacting with each other and with the other abiotic components.
- (c) It is a nearly closed system that is able to change the Earth's surface physically, chemically and biologically through a continuous change among the three states of water.
- (d) It is a process by which the plant gets rid of excess water in the form of vapor from its surface exposed to the air.
- (e) Microscopic openings found on the surfaces of leaves and green stems, through which most transpiration occurs.
- (f) A process by which living organisms get rid of the waste products resulting from the metabolic processes.

2 Give reasons for:

- (a) The living organisms interact with each other and with the non-living components in the ecosystem.
- (b) Ocean water is not suitable for direct use.
- (c) Condensation has an important role in the water cycle in nature.
- (d) Stomata have a role in adaptation of plant with the high atmospheric temperature.

3 What happens in each of the following cases:

- (a) Water infiltration through the soil pores and sedimentary rocks.
- (b) Plants perform the transpiration process, "**regarding:** the transportation process in plant".

4 Compare between each of the following:

- (a) The biotic components and the abiotic components in the environment "**in terms of:** examples".
- (b) Salt water and frozen water "**in terms of:** their percentage from the total water percentage on Earth".

5 Explain how clouds are formed and the importance of this process in water cycle.**6 The importance of transpiration is not limited on plant only. Explain this.****Questions that measure high levels of thinking**

Answered in detail

Choose the correct answer:

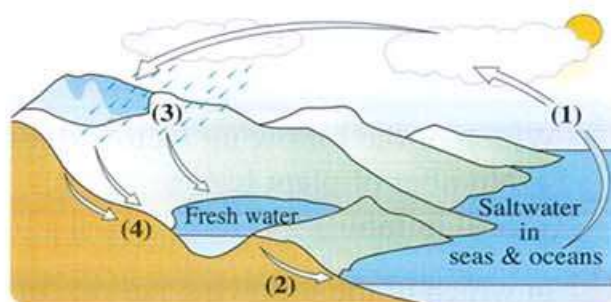
The opposite figure illustrates some processes in the water cycle in nature:

- (1) Which of the following processes directly precedes the condensation process?

- (a) (1).
- (b) (2).
- (c) (3).
- (d) (4).

- (2) Which of the following processes **doesn't** occur by the effect of gravity?

- (a) (1).
- (b) (2).
- (c) (3).
- (d) (4).



Questions ?

Unit 1 | Lesson 2

Answered

Chemical Properties of Water

First

Multiple Choice Questions

Questions signed by * are answered in detail.

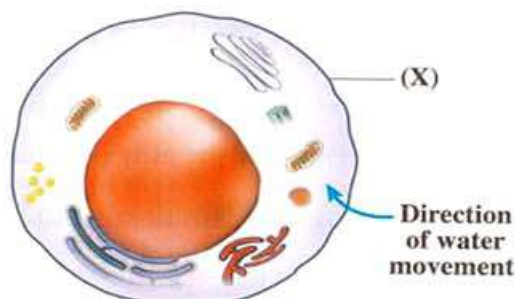
Interactive
test



Chemical composition of water

- 1 The opposite figure represents an animal cell, what is the role of structure (X) on passing water through it in the direction illustrated in the figure?

(a) Producing energy.
(b) Allowing the passage of nutrients.
(c) Allowing the passage of wastes.
(d) Protecting the cell.



- 2 Which of the following **isn't** from the properties of water that support life?

(a) Dissolving many chemical compounds.
(b) Passing required substances to inside the cell.
(c) Passing the wastes to outside the cell.
(d) The difference in the mass of its elements.

- 3 The value of the angle between the two bonds in the water molecule is

(a) 10.45° (b) 104.5° (c) 105.4° (d) 10.54°

- 4 Which of the following is correct about water molecule?

(a) The ratio of hydrogen mass to oxygen mass is 1 : 2
(b) The percentage of hydrogen mass represents 33.33%
(c) The percentage of oxygen mass represents 88.89%
(d) The external angle between the two hydrogen atoms represents 104.5°

- 5 Which of the following represents the mass percentages of each of hydrogen and oxygen respectively in a water sample?

(a) 33.33% , 66.67% (b) 66.67% , 33.33%
(c) 11.11% , 88.89% (d) 88.89% , 11.11%

- 6 What is the approximate ratio of oxygen mass to hydrogen mass in water molecule?

(a) $\frac{1}{8}$ (b) $\frac{1}{2}$ (c) $\frac{2}{1}$ (d) $\frac{8}{1}$

- 7 * What is the mass of hydrogen in a sample of distilled water whose mass is 200 g?
(a) 11.11 g (b) 22.22 g (c) 88.89 g (d) 177.78 g
- 8 The number of electrons shared by two hydrogen atoms to form covalent bonds in a water molecule
(a) 1 (b) 2 (c) 3 (d) 4

Chemical properties of water

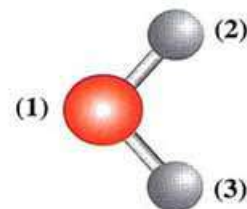
- 9 Which of the following is correct about the two elements that forming water molecule?
(a) Oxygen is smaller in mass and greater in electronegativity.
(b) Oxygen is greater in mass and less in electronegativity.
(c) Hydrogen is greater in mass and higher in electronegativity.
(d) Hydrogen is smaller in mass and less in electronegativity.
- 10 What is the type of bonds among water molecules?
(a) Hydrogen bonds. (b) Single covalent bonds.
(c) Ionic bonds. (d) Double covalent bonds.
- 11 The reason for the polarity of the water molecule is the difference in
(a) electronegativity of its elements
(b) the atomic mass of its elements
(c) the number of covalent bonds between its atoms
(d) the type of covalent bonds between its atoms
- 12 Water polarity causes
(a) the dissolution of many substances in it (b) decreasing its density
(c) its acidic effect (d) its basic effect
- 13 The maximum number of hydrogen bonds that each water molecule can form, equals
(a) 1 (b) 2 (c) 3 (d) 4
- 14 Hydrogen bond is originated among water molecules, due to the attraction between
(a) oxygen atom in water molecule with oxygen atom in another water molecule
(b) hydrogen atom in water molecule with hydrogen atom in another water molecule
(c) oxygen atom in water molecule with hydrogen atom in another water molecule
(d) oxygen atom with hydrogen atom in the same water molecule

15 What is the reason of the formation of hydrogen bonds among water molecules?

- (a) Volume of (O) atom > Volume of (H) atom.
- (b) Mass of (O) atom > Mass of (H) atom.
- (c) Density of (O) atom > Density of (H) atom.
- (d) Electronegativity of (O) atom > Electronegativity of (H) atom.

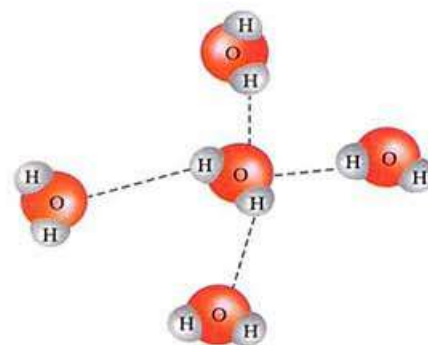
16 The opposite figure illustrates the structure of water molecule, which of the following atoms carry a partial positive charge?

- (a) (1) and (2).
- (b) (1) and (3).
- (c) (2) and (3).
- (d) (1), (2) and (3).



17 The opposite figure represents a number of water molecules. What is the number of hydrogen and covalent bonds respectively?

- (a) 4 , 10
- (b) 5 , 4
- (c) 4 , 5
- (d) 10 , 4



18 When comparing the boiling point of H_2O with the boiling point of H_2S ,

- (a) H_2O is higher, as its molecules are bound by hydrogen bonds
- (b) H_2S is higher, as its molecules are bound by hydrogen bonds
- (c) H_2O is higher due to its small molecular mass
- (d) H_2S is higher due to its great molecular mass

19 Water resembles hydrogen sulphide in

- (a) molecular mass
- (b) the boiling point
- (c) the presence of hydrogen bonds
- (d) the molecule structure

20 * On heating a sample of pure water till boiling,

- (a) the covalent bonds are broken and water molecules are released in the form of water vapor
- (b) the covalent bonds are broken and hydrogen atoms are separated from oxygen atoms
- (c) the hydrogen bonds are broken and water molecules are released in the form of water vapor
- (d) the hydrogen bonds are broken and hydrogen atoms are separated from oxygen atoms

21 * At normal atmospheric pressure, the boiling point of pure water (H_2O) is greater than that of hydrogen sulphide (H_2S) by

- (a) 100°C
- (b) -61°C
- (c) 39°C
- (d) 161°C

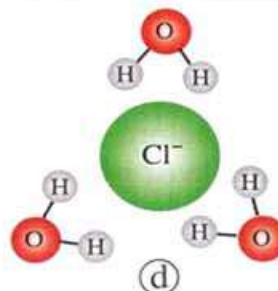
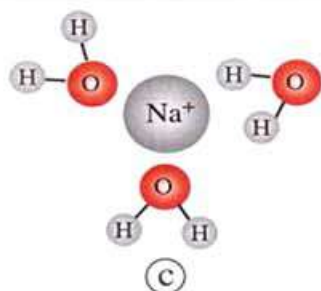
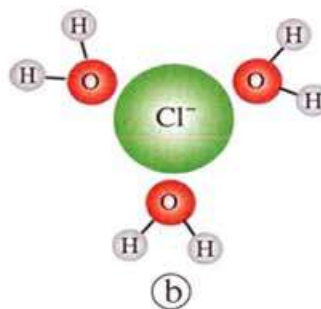
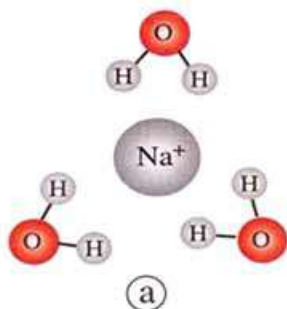
- 22 * The boiling point of compound H_2X is less than that of compound H_2Y . Which of the following is correct?

	The electronegativity of element (X)	The polarity of compound (H_2Y)
(a)	Greater than the electronegativity of element (Y)	Less than the polarity of compound (H_2X)
(b)	Greater than the electronegativity of element (Y)	Greater than the polarity of compound (H_2X)
(c)	Less than the electronegativity of element (Y)	Less than the polarity of compound (H_2X)
(d)	Less than the electronegativity of element (Y)	Greater than the polarity of compound (H_2X)

- 23 Which of the following happens when sodium chloride salt is added to water?

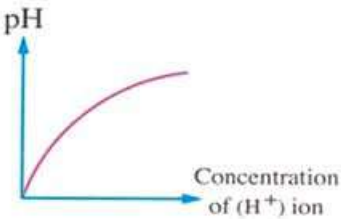
- (a) Positive ions bound to the positive pole of water.
- (b) Negative ions bound to the negative pole of water.
- (c) The crystal lattice of the salt dissociates.
- (d) Hydrolysis of salt ions.

- 24 Which of the following forms is correct when table salt is added to water?

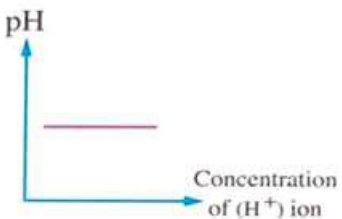


- 25 On dissolving ammonium chloride salt in water,

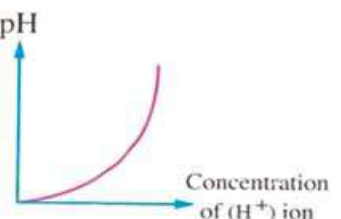
- (a) hydrolysis takes place and the solution becomes acidic
- (b) hydrolysis takes place and the solution becomes basic
- (c) the salt dissociates but no hydrolysis takes place
- (d) the salt doesn't dissociate and no hydrolysis takes place

- 26 * Which of the following solutions has the highest pH value?
 (a) Ammonium bicarbonate solution. (b) Acetic acid solution.
 (c) Potassium bicarbonate solution. (d) Nitric acid solution.
- 27 On dissolving sodium bicarbonate salt in water, the solution becomes
 (a) acidic (b) basic (c) neutral (d) amphoteric
- 28 Which of the following resulting from the dissolution of sodium bicarbonate in water?
 (a) The concentration of (OH^-) ions decreases.
 (b) The concentration of (H^+) ions increases.
 (c) The pH value decreases. (d) The pH value increases.
- 29 When immersing the pH paper test tape in a sample of concentrated solution of NaOH, the tape color becomes
 (a) red (b) orange (c) green (d) blue
- 30 When dissolving an unknown salt in water, it leads to a decrease in the concentration of (OH^-) ions in it. What is your conclusion about the nature of the unknown salt solution?
 (a) Acidic. (b) Basic. (c) Neutral. (d) Amphoteric.
- 31 In which of the following salt solutions of equal concentration is the hydrogen ion concentration the highest?
 (a) KCl (b) NH_4Cl (c) NH_4HCO_3 (d) NaHCO_3
- 32 The ratio between the concentration of hydrogen ions in a certain amount of pure water to the concentration of hydrogen ions after the dissolution of 10 g of ammonium chloride salt in this amount of water is
 (a) greater than 1 (b) less than 1 (c) equal to 1 (d) equal to 7
- 33 Which of the following graphs illustrates the relation between the pH value of the solution and the concentration of (H^+) ions in it?
- 

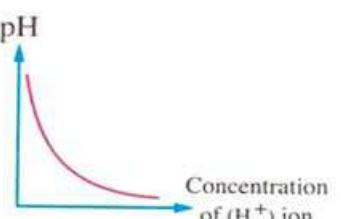
(a)



(b)



(c)

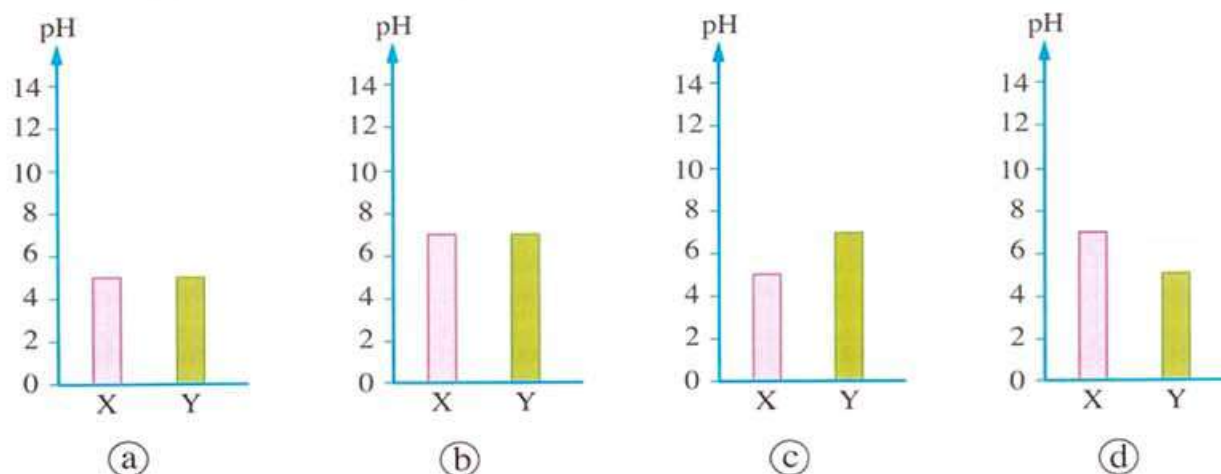


(d)
- 34 The solution at which the concentration of (H^+) ions is less than the concentration of (OH^-) ions is
 (a) acidic solution and its pH value is less than 7
 (b) acidic solution and its pH value is greater than 7
 (c) basic solution and its pH value is less than 7
 (d) basic solution and its pH value is greater than 7

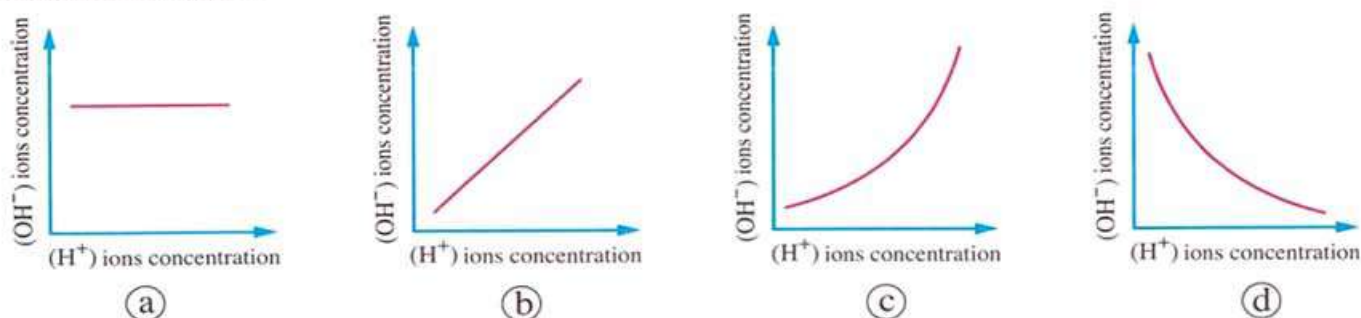
35 You have a solution of an unknown salt whose ($\text{pH} = 5.3$). So, it is probable that the solution is for salt.

- (a) sodium chloride (b) sodium bicarbonate
(c) ammonium chloride (d) ammonium bicarbonate

36 Which of the following graphs represents the pH of a sample of ammonium bicarbonate solution (X) and another sample of ammonium chloride solution (Y)?



37 Which of the following graphs correctly expresses the relation between the concentration of each of (OH^-) and (H^+) ions with the continuous dissolution of excess ammonium chloride in water?



38 When dissolving potassium bicarbonate salt in a suitable amount of distilled water, the pH value of the solution increases as a result of

- (a) increasing the concentration of (H^+) ions
(b) increasing the concentration of (OH^-) ions
(c) decreasing the concentration of (OH^-) ions
(d) decreasing the concentration of each (H^+) and (OH^-) ions

39 * The ratio between (H^+) ions concentration in an acidic solution to their concentration in an alkaline solution is

- (a) greater than 1 (b) equals 1
(c) less than 1 (d) equals 7

40 If the pH value of a solution is 12.5, then the solution may be

- (a) hydrochloric acid (b) ammonium bicarbonate
(c) pure water (d) sodium hydroxide

41 * Which of the following expresses the ratio between the concentration of (H^+) ions and (OH^-) ions respectively in each of pure water and ammonium bicarbonate solution?

	Pure water	Ammonium bicarbonate solution
(a)	1 : 1	1 : 2
(b)	2 : 1	1 : 1
(c)	2 : 1	2 : 1
(d)	1 : 1	1 : 1

42 Which of the following expresses the relation between the concentration of (OH^-) ions and (H^+) ions in each of ammonium chloride solution and sodium bicarbonate solution?

	Ammonium chloride solution	Sodium bicarbonate solution
(a)	$(OH^-) > (H^+)$	$(OH^-) < (H^+)$
(b)	$(OH^-) < (H^+)$	$(OH^-) > (H^+)$
(c)	$(OH^-) > (H^+)$	$(OH^-) = (H^+)$
(d)	$(OH^-) = (H^+)$	$(OH^-) > (H^+)$

43 On diluting a concentrated hydrochloric acid HCl, the pH value increases as a result of

- (a) increasing the concentration of Cl^- ions
(b) decreasing the concentration of Cl^- ions
(c) increasing the concentration of H^+ ions
(d) decreasing the concentration of H^+ ions

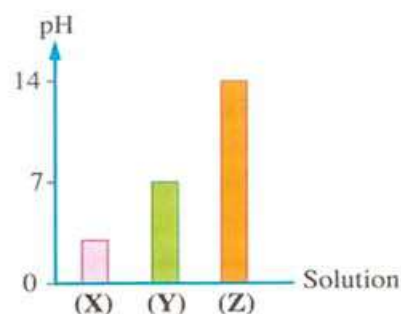
44 The patient who suffers from severe stomach acid secretion (stomach acid reflux) is advised to

- (a) use a suitable treatment that decreases the pH value
(b) use a suitable treatment that increases the pH value
(c) eat food that increases the (H^+) ions concentration
(d) drink soda that contains percentage of CO_2

45 On adding drops of sulphuric acid to an amount of distilled water, the pH value of the resulted solution becomes

- (a) 12 (b) 5 (c) 7 (d) 8

- 46 The opposite graph represents the pH values of three solutions (X), (Y) and (Z). Which of the following is correct about the concentration of (H^+) and (OH^-) ions?



- (a) In solution (X), the concentration of (H^+) ion = the concentration of (OH^-) ion.
- (b) In solution (Y), the concentration of (H^+) ion > the concentration of (OH^-) ion.
- (c) In solution (Z), the concentration of (H^+) ion < the concentration of (OH^-) ion.
- (d) In solution (X), the concentration of (OH^-) ion > the concentration of (H^+) ion.

- 47 * The following equation expresses the hydrolysis of XY salt:



Which of the following can express the pH of the resulting solution?

- (a) 4
- (b) 6
- (c) 7
- (d) 10

- 48 * Which of the following is correct about the acid and base resulting from the dissolution of ammonium chloride salt in water?

	The resulting acid	The resulting base
(a)	Strong	Strong
(b)	Weak	Weak
(c)	Strong	Weak
(d)	Weak	Strong

Second Miscellaneous Questions

- 1 Write the scientific term for each of the following statements:

- (a) A type of chemical bonds that binds between two atoms by sharing electrons where each atom shares one or more electron.
- (b) A measurement for the atom's ability to attract the electrons of the chemical bond towards itself for a longer period of time.
- (c) An electrostatic attraction between the partially positive hydrogen atom in a water molecule and the partially negative oxygen atom in an adjacent water molecule.
- (d) A reaction occurs when a solid salt is dissolved in water forming an acid and a base one or both are weak.

- (e) * A quantitative measurement with values ranging from 0 to 14, that expresses the acidity or neutrality or alkalinity of solutions or liquids.
* A measurement that expresses the concentration of hydrogen ions and hydroxide ions in the solution.
- (f) The solution where the concentration of hydrogen ions equals the concentration of hydroxide ions.
- (g) The solution where the concentration of hydrogen ions is less than the concentration of hydroxide ions.
- (h) The solution where the concentration of hydrogen ions is higher than the concentration of hydroxide ions.

2 Give reasons for:

- (a) Water has an important role inside the living organisms' cells.
- (b) Water is a polar compound.
- (c) * The elevation of the boiling point of pure water, although it is a covalent compound.
* Water is liquid while hydrogen sulphide is gas, despite their similarity in structure.
- (d) The dissolution of sodium chloride in water isn't considered hydrolysis.
- (e) * Pure water is neutral.
* Water is ionically balanced.
- (f) The solution that is produced from the dissolution of ammonium bicarbonate salt in water is neutral.
- (g) The solution that is produced from the dissolution of sodium bicarbonate salt in water is alkaline.
- (h) The solution that is produced from the dissolution of ammonium chloride salt in water is acidic.

3 What happens in each of the following cases:

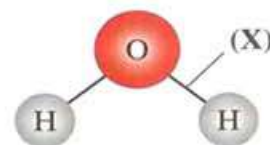
- (a) Polarity of water molecule.
- (b) Adding sodium chloride crystals to water.
- (c) Dissolution of ammonium bicarbonate salt in water "**regarding:** the concentration of (H^+) and (OH^-) ions".
- (d) Dissolution of sodium bicarbonate salt in water "**regarding:** the pH" value.
- (e) Dissolution of ammonium chloride salt in water "**regarding:** the pH" value.

4 Compare between each of the following:

- (a) Pure water and hydrogen sulphide "**in terms of:** structure – boiling point – molecule polarity – presence of hydrogen bonds – molecular mass".
- (b) Ammonium bicarbonate, sodium bicarbonate and ammonium chloride salts when dissolving each of them in water "**in terms of:** the pH of the solution – the relation between the concentration of (H^+) and (OH^-) in the solution – the type of the solution".

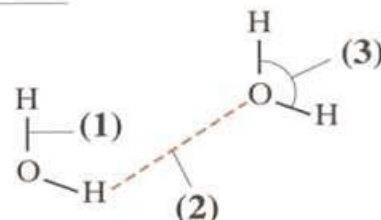
5 Study the opposite figure, then answer:

- (a) What is the type of bond (X)?
 (b) Determine the places of the partial positive and partial negative charges on the figure.



6 The opposite figure shows two types of bonds:

- (a) What is the type of bonds (1) and (2)?
 (b) What is the value of angle (3)?
 (c) Determine the bond number which is responsible for the elevation of water temperature.



7 Show a difference between the covalent bond and the hydrogen bond in water.

8 If you have three solutions (ammonium chloride – sodium bicarbonate – ammonium bicarbonate). How can you distinguish them by using the pH-meter?

Questions that measure **high levels of thinking**

Answered in detail

Choose the correct answer:

1 The opposite figure shows two water molecules, where a hydrogen bond is formed between the two atoms

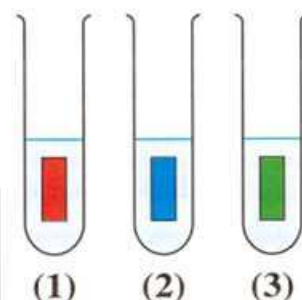
- (a) (1) and (2) (b) (2) and (3)
 (c) (2) and (4) (d) (1) and (4)



2 On adding drops of sodium hydroxide (NaOH) solution to hydrochloric acid (HCl) solution (pH = 3), the pH value of the produced solution is

- (a) 1 (b) 4 (c) 3 (d) 2

3 Three pH test strips were immersed in three solutions (1), (2) and (3), as in the opposite figure. Which of the following choices is correct?



	Solution (1)	Solution (2)	Solution (3)
(a)	Ammonium chloride	Sodium bicarbonate	Ammonium bicarbonate
(b)	Ammonium bicarbonate	Ammonium chloride	Sodium bicarbonate
(c)	Sodium bicarbonate	Ammonium bicarbonate	Ammonium chloride
(d)	Ammonium bicarbonate	Sodium bicarbonate	Ammonium chloride

Answered

Interactive test



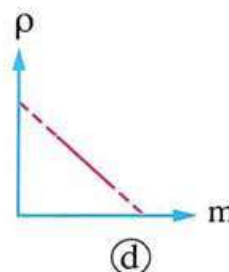
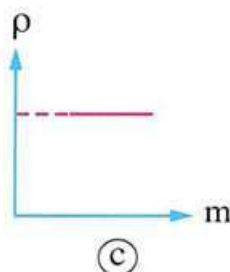
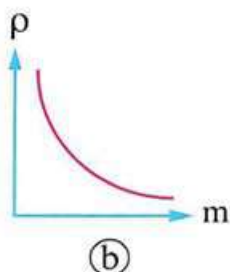
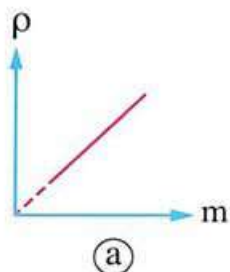
First

Multiple Choice Questions

Questions signed by * are answered in detail.

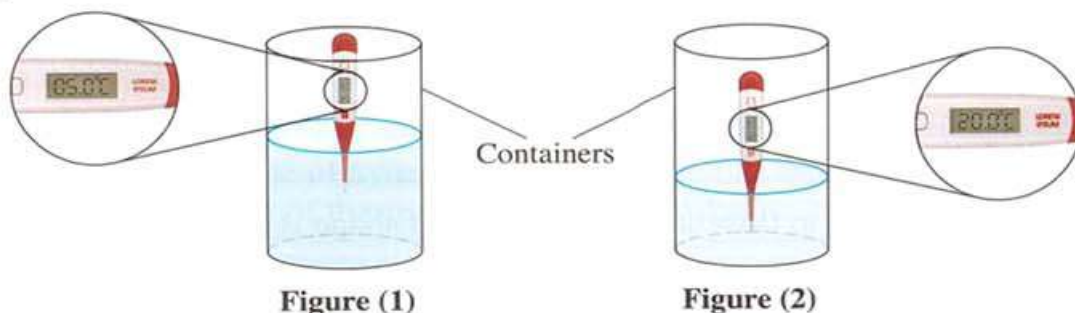
Density - Relative density - Hydrometer

- 1 The ability of a substance to flow and not take a fixed shape is a characteristic of
 (a) solids and liquids (b) solids and gases
 (c) liquids and gases (d) solids, liquids and gases
- 2 One of the units of density measurement is
 (a) g.cm^3 (b) g.mm^{-1} (c) kg.cm^{-1} (d) g.L^{-1}
- 3 Two solid cylinders are made of the same metal and have the same diameter, one of them is longer than the other at the same temperature, so both cylinders have the same
 (a) mass (b) density (c) volume (d) weight
- 4 In an experiment to measure the degree of pollution in a swimming pool, two samples, A and B, were taken at the same time from the swimming pool with volumes of 10 cm^3 and 40 cm^3 respectively, so the ratio of the density of water in sample B to the density of water in sample A is expected to be
 (a) $\frac{1}{1}$ (b) $\frac{2}{1}$ (c) $\frac{4}{1}$ (d) $\frac{1}{4}$
- 5 Liquid at a specific temperature was poured into a cylindrical container until its level reached the middle of the container. The density of the liquid was (ρ), if more of the same liquid is poured at the same temperature to completely fill the container, the density of the liquid will be equal to
 (a) $\frac{1}{2} \rho$ (b) 2ρ (c) $\frac{3}{2} \rho$ (d) ρ
- 6 The graph that represents the relationship between the density (ρ) of pure water and the mass (m) of samples from it at a temperature of 50°C is



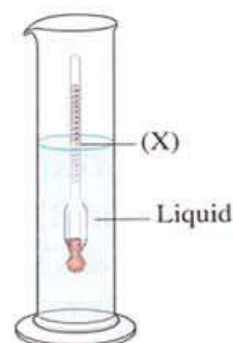
- 7 Given that the relative density of mercury is higher than the relative density of alcohol at the same temperature, then the ratio of the mass of 1 cm^3 of mercury to the mass of the same volume of alcohol is
 (a) greater than 1 (b) less than 1 (c) equal to 1 (d) indeterminable

- 8 Two containers contain two different amounts of water. A thermometer is used to measure the temperature of water in each of them, as shown in the following figures:

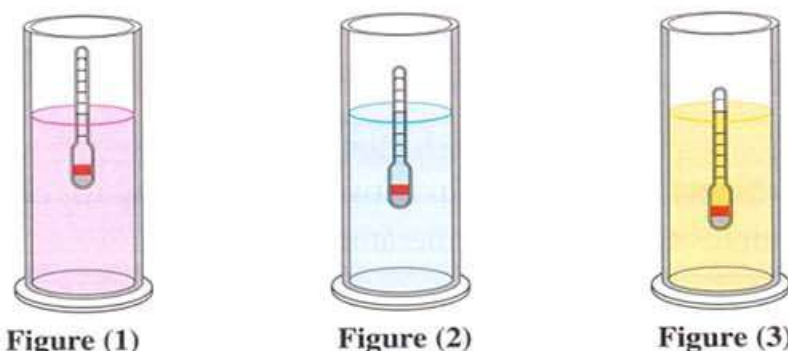


In which of the two figures (1) or (2) are the intermolecular spaces between water molecules greater?

- (a) In figure (1). (b) In figure (2).
 (c) Equal in both figures. (d) Zero in both figures.
- 9 When a hydrometer is placed in a beaker containing a liquid, the free surface of the liquid intersects the hydrometer at the mark (X), as shown in the figure. When adding more of the same liquid at the same temperature until the beaker gets full, the free surface of the liquid will be
 (a) still at the mark (X)
 (b) above the mark (X)
 (c) below the mark (X)
 (d) above the hydrometer completely



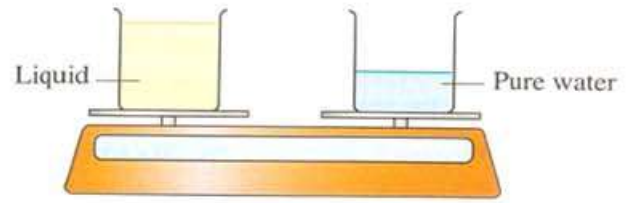
- 10 * Three glass containers, each containing a liquid. Three identical hydrometers were used to measure the densities of the three liquids so that their positions at equilibrium were as shown in the following figures:



So, the correct order of these figures according to the density of the liquid in each container is

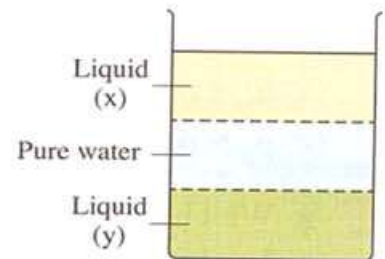
- (a) $(1) < (2) < (3)$ (b) $(1) < (3) < (2)$
 (c) $(3) < (2) < (1)$ (d) $(2) < (3) < (1)$

- 11 * The figure shows two similar beakers, one contains pure water while the other contains another liquid, placed on the two pans of a balance, so if the pans are balanced at the same horizontal level, the relative density of the liquid is



- (a) greater than 1
(b) less than 1
(c) equal to 1
(d) indeterminable

- 12 * The opposite figure shows three immiscible liquids in one container, so the ratio between the density of liquid (x) and that of liquid (y) is

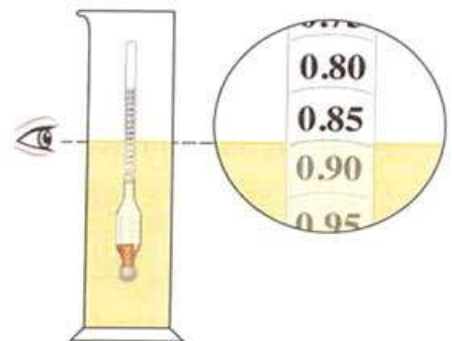


- (a) greater than 1
(b) less than 1
(c) equal to 1
(d) indeterminable

- 13 If the density of the oil is 800 g/L, then its density in g/cm^3 and kg/m^3 is

	g/cm^3	kg/m^3
(a)	800	0.8
(b)	0.8	800
(c)	0.8	0.8
(d)	800	800

- 14 * The opposite figure shows the measurement of the relative density of a sample of a liquid. If the relative density of pure water is 1 g/cm^3 , the density of the liquid equals



- (a) 750 kg/m^3
(b) 800 kg/m^3
(c) 850 kg/m^3
(d) 950 kg/m^3

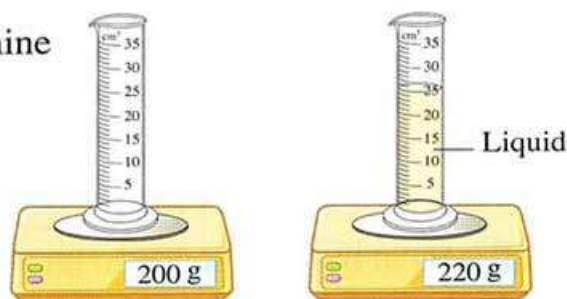
- 15 * The opposite figure shows a solid cube with a side length of 2 cm. When placed on a balance, the balance reading was 21.6 g, so the density of the cube material is



- (a) 2700 kg/m^3
(b) 3600 kg/m^3
(c) 5400 kg/m^3
(d) 10800 kg/m^3

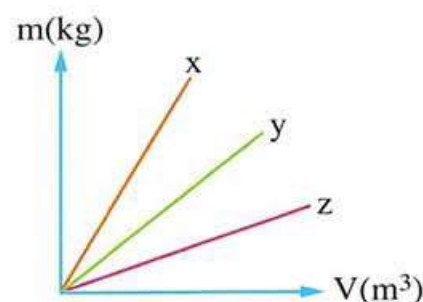
- 16 * The opposite figure shows an experiment to determine the density of a liquid, so the density of the liquid equals

(a) 600 kg/m^3 (b) 700 kg/m^3
(c) 800 kg/m^3 (d) 1000 kg/m^3

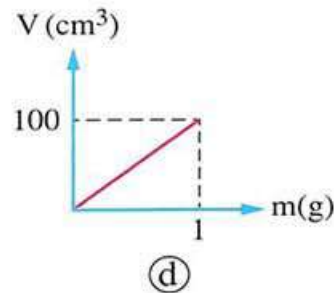
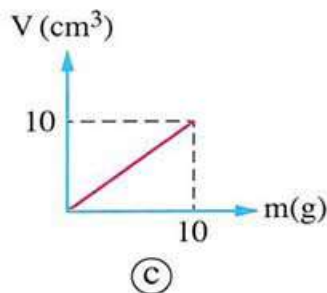
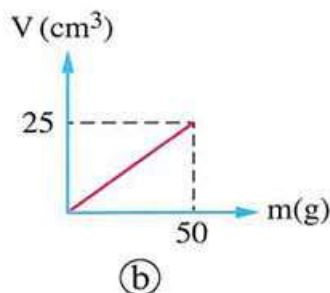
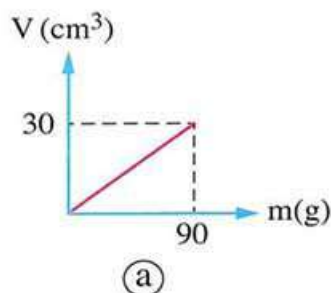


- 17 The opposite graph represents the relation between the mass (m) and the volume (V) for different samples that are taken from three liquids. (x), (y) and (z), so the correct order for the density of the three liquids is

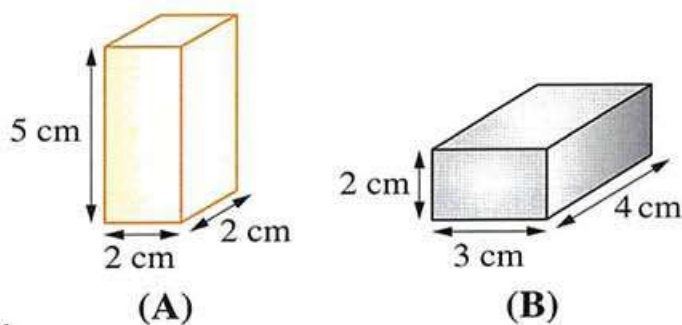
(a) $\rho_x < \rho_y < \rho_z$ (b) $\rho_x = \rho_y = \rho_z$
(c) $\rho_x > \rho_y > \rho_z$ (d) $\rho_x < \rho_y > \rho_z$



- 18 * Which of the following graphs represents the relation between the volume (V) in cm^3 and the mass (m) in grams for samples of pure water of density 1000 kg/m^3 ?

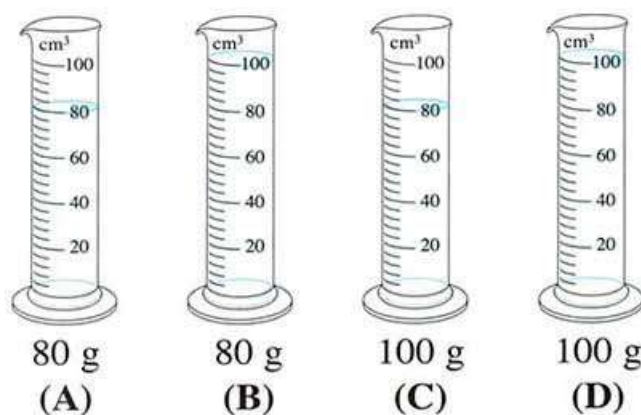


- 19 The opposite figure shows the dimensions of two solid bodies, A and B, having the same mass, so which body is made of the material of the higher density?
- (a) Body (A).
(b) Body (B).
(c) Both bodies have the same material density.
(d) The answer cannot be determined.



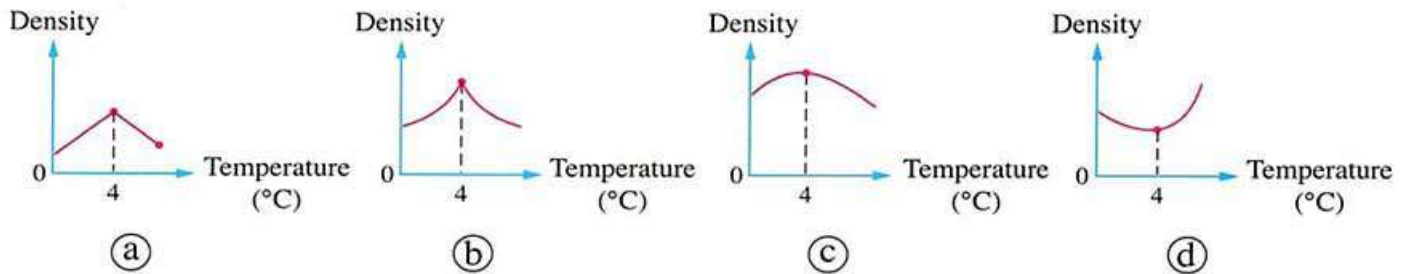
- 20 The opposite figure shows four graduated cylinders (A), (B), (C) and (D), each containing a liquid where the mass of each liquid is shown below its cylinder. All the cylinders are in the same room at a temperature of 25°C , so the two cylinders that contain the same liquid are

(a) (A) and (D) (b) (B) and (C)
(c) (A) and (C) (d) (B) and (D)

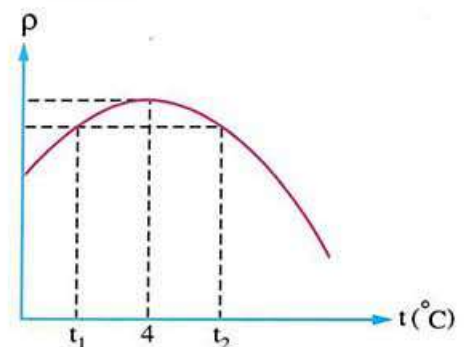


Water density - Water currents in the oceans

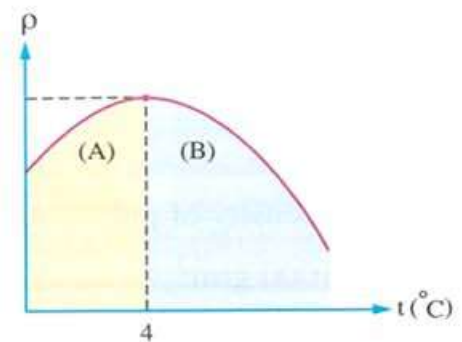
- 21 The density of pure water reaches its maximum value at
 (a) 0°C (b) 4°C (c) 100°C (d) 104.5°C
- 22 The density of pure water at 4°C in SI (International system) units is
 (a) 1000 g/m^3 (b) 1 g/cm^3 (c) 1000 kg/m^3 (d) 1000 kg/cm^3
- 23 Which of the following graphs represents the change in the density of pure water with temperature?



- 24 What happens to the molecules of pure water when its temperature decreases from 4°C to 0°C ?
 (a) They get closer to each other.
 (b) They get away from each other.
 (c) They remain consistent in their positions.
 (d) Their volumes decrease.
- 25 A quantity of pure water of temperature 3°C is placed in a refrigerator, then the mass and volume of the water when it freezes respectively
 (a) doesn't change, doesn't change (b) doesn't change, increases
 (c) increases, doesn't change (d) increases, increases
- 26 When the temperature of pure water increases from 4°C to 8°C , what happens to the volume and the density of water respectively?
 (a) Increases, Increases. (b) Decreases, Increases.
 (c) Increases, Decreases. (d) Decreases, Decreases.
- 27 The opposite graph represents the change in the density of pure water (ρ) with temperature (t), so the ratio of the volume of 1 g of water at temperature t_1 to the volume of 1 g of water at temperature t_2 is
 (a) greater than 1 (b) less than 1
 (c) equal to 1 (d) indeterminable

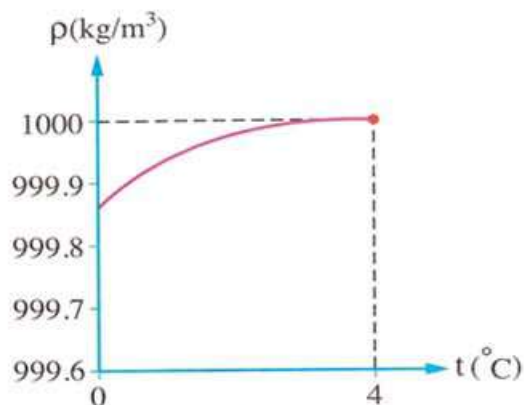


- 28 The opposite graph represents the relation between density (ρ) of pure water and temperature (t). Which of the regions, (A) or (B), on the graph represents the anomaly of water compared to other liquids when cooled? And why?

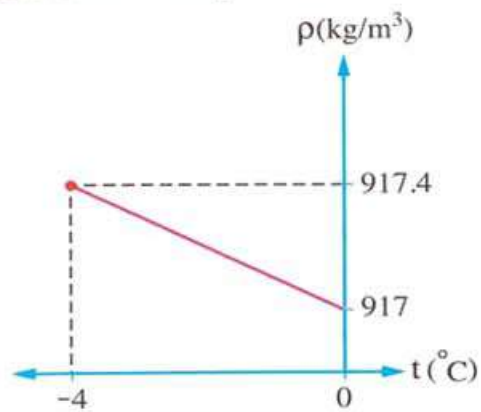


- (a) Region (A), because water expands in it.
 (b) Region (A), because water contracts in it.
 (c) Region (B), because water expands in it.
 (d) Region (B), because water contracts in it.

- 29 Graph (1) represents the relation between density (ρ) of pure water and its temperature (t) on the Celsius scale. Graph (2) represents the same relationship for ice.



Graph (1)



Graph (2)

By studying the two graphs, the density of ice at 0°C is

- (a) equal to the density of liquid water at 0°C
 (b) greater than the density of liquid water at 0°C
 (c) less than the density of liquid water at 0°C
 (d) indeterminable
- 30 What is the mass of a quantity of pure water that has a volume of 20 cm^3 at a temperature of 4°C ?
 (a) 10 g (b) 20 g (c) 100 g (d) 200 g
- 31 * If the volume of 1 kg of pure water at a temperature of 4°C is V_1 and the volume of 1 kg of pure water at a temperature of 2°C is V_2 , so the ratio $\left(\frac{V_1}{V_2}\right)$ is
 (a) greater than 1 (b) less than 1 (c) equal to 1 (d) indeterminable
- 32 A quantity of pure water has a mass of 100 g, so its volume at:
 (1) 4°C is
 (a) 100 cm^3 (b) greater than 100 cm^3
 (c) less than 100 cm^3 (d) indeterminable
 (2) 20°C is
 (a) 100 cm^3 (b) greater than 100 cm^3
 (c) less than 100 cm^3 (d) indeterminable

33 At which of the following temperatures:

(1) does one cubic meter of pure water have the greatest mass?

- (a) 4°C (b) 10°C (c) 25°C (d) 80°C

(2) does one kilogram of pure water have a greater volume?

- (a) 4°C (b) 10°C (c) 25°C (d) 80°C

34 A quantity of pure water has a temperature of 2°C. Which of the following changes in its temperature will cause a greater decrease in its density?

- (a) Increasing by 1°C (b) Decreasing by 1°C
(c) Increasing by 2°C (d) Decreasing by 2°C

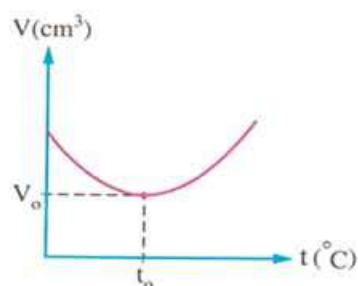
35 * The opposite graph represents the relation between the volume (V) of a quantity of pure water of mass 20 g and its temperature (t), so:

(1) The value of (t_0) on the graph equals

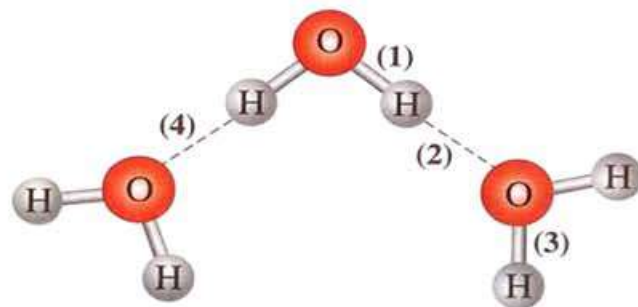
- (a) 2°C (b) 4°C
(c) 8°C (d) 10°C

(2) The value of (V_0) on the graph equals

- (a) 9.9 cm³ (b) 10 cm³ (c) 20 cm³ (d) 22 cm³



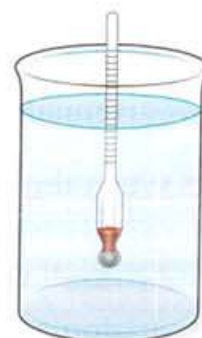
36 * The opposite figure shows some water molecules, so the bonds that are responsible for the unique behavior of water density compared to the other compounds of similar composition are



- (a) (1), (2) (b) (1), (3)
(c) (3), (4) (d) (2), (4)

37 * The opposite figure shows a hydrometer balanced in pure water. What happens to the hydrometer if salt is added and dissolved in the water?

- (a) A larger part of it sinks into the water.
(b) A larger part of it floats up.
(c) The length of the floating part of it does not change.
(d) The answer cannot be determined.



38 * A beaker contains pure water at a temperature of 4°C . What happens to the density of the water in the beaker when:

(1) adding an equal quantity of pure water at 10°C to the beaker?

- (a) Increases.
- (b) Decreases.
- (c) Doesn't change.
- (d) The answer cannot be determined.

(2) dissolving a quantity of salt in it?

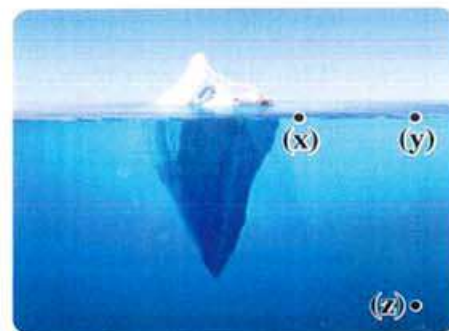
- (a) Increases.
- (b) Decreases.
- (c) Doesn't change.
- (d) The answer cannot be determined.

39 Which of the following factors **doesn't** directly affect ocean currents?

- (a) Variation of the water salinity.
- (b) Variation of the water temperature.
- (c) Variation of the water pressure.
- (d) Variation of the marine organism's species.

40 The opposite figure shows an iceberg in an ocean, At which of the positions (x), (y), (z) shown in the figure the water has the higher density?

- (a) Position (x).
- (b) Position (y).
- (c) Position (z).
- (d) The water density is the same at all three positions.



41 At which of the following positions in water the density of water is higher assuming all are at a temperature of 4°C ?

- (a) Deep Ocean.
- (b) Sea surface.
- (c) The surface of a lake of freshwater.
- (d) The bottom of a frozen river.

42 * In a closed saltwater lake, when the water level decreases in the lake over time due to evaporation of water from it, the density of the lake water

- (a) increases
- (b) decreases
- (c) remains unchanged
- (d) the answer cannot be determined

43 When the melting glaciers enter the ocean water, they

- (a) mix because each is a liquid water with the same density
- (b) don't mix and the salty water floats on the surface of the fresh water
- (c) don't mix and the fresh water floats on the surface of the salty water
- (d) mix because they are two liquids with different density

Internal energy - Temperature - Amount of heat

- 44 The internal energy of a body is equal to
- (a) the average kinetic energy of the body's molecules
 - (b) the average potential energy of the body's molecules
 - (c) the difference between the kinetic energies of the body's molecules and their potential energies
 - (d) the sum of the kinetic energies of the body's molecules and their potential energies

- 45 The thermal energy that is transferred from hot bodies to cold bodies is called
- (a) temperature
 - (b) specific heat
 - (c) amount of heat
 - (d) internal energy

- 46 Which pair of the following physical quantities have the same unit of measurement?
- (a) Amount of heat and temperature.
 - (b) Specific heat and temperature.
 - (c) Amount of heat and internal energy.
 - (d) Internal energy and temperature.

- 47 When heating a quantity of water from 10°C to 20°C , then

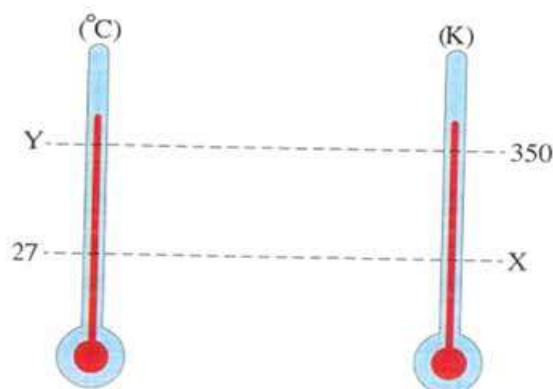
	The amplitude of water molecules vibrations	The internal energy of water
(a)	Decreases	Increases
(b)	Increases	Doesn't change
(c)	Increases	Increases
(d)	Doesn't change	Decreases

- 48 The absolute zero is equivalent to

- (a) 0°C
- (b) -273°C
- (c) 273 K
- (d) 373 K

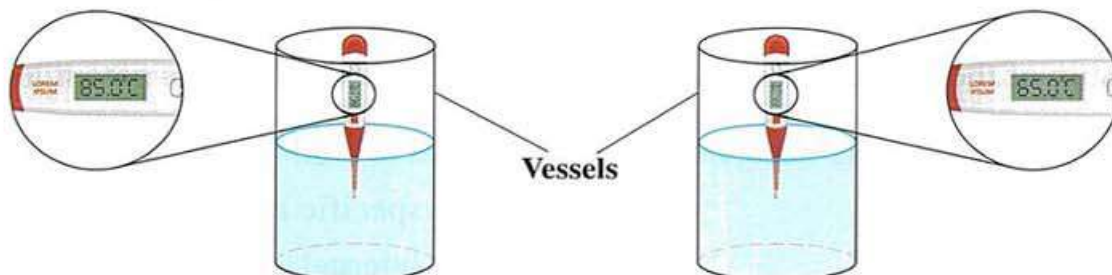
- 49 The opposite figure represents corresponding values of temperature on Kelvin and Celsius scales, what are the values of temperature X and Y, respectively?

- (a) 300 K , 30°C
- (b) 327 K , 30°C
- (c) 300 K , 77°C
- (d) 327 K , 77°C



- 50 The internal energy of a water quantity of mass 1 kg is higher at a temperature of
(a) 4°C (b) 340 K (c) 40°C (d) 300 K

- 51 When the temperatures of two quantities of water were measured using a thermometer, the thermometer readings were recorded as shown in the following figures:



So, the difference between the temperatures of the two quantities of water on Kelvin scale is equal to

- (a) 273 K (b) 293 K (c) 253 K (d) 20 K
- 52 At what temperature does the mass of a sample of distilled water in (grams) equal the volume of the sample in (cm^3)?
(a) 100°C (b) 373 K (c) 277 K (d) 273°C

- 53 A certain quantity of a substance whose temperature is raised from 30°C to 310 K, then the amount of change in temperature is equal to
(a) 7 K (b) 37°C (c) 280 K (d) 280°C

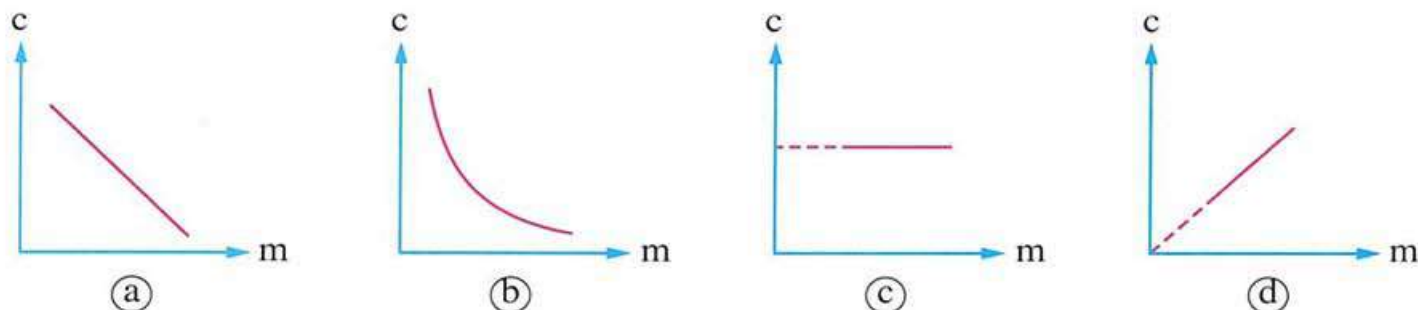
- 54 * If the temperature of an object is 220 K, then when the temperature of this object changes to -3°C , the average kinetic energy of the molecules of that object
(a) increases (b) decreases
(c) doesn't change (d) Can't be determined the answer

- 55 When you put ice cubes in your hand,
(a) heat flows from ice to your hand (b) heat flows from your hand to ice
(c) coldness flows from ice to your hand (d) coldness flows from your hand to ice

- 56 What happens to a piece of iron whose temperature is -10°C when it is placed in an insulated cup containing water at a temperature of 10°C ?
(a) The internal energy of the iron piece decreases.
(b) The density of the iron increases.
(c) The mass of the iron decreases.
(d) The speed of the iron molecules increases.

Specific heat

- 57 If the amount of heat absorbed by a body doubles, its specific heat
- (a) doubles (b) halves
(c) remains constant (d) becomes a quarter
- 58 Which of the following graphs represents the relation between the specific heat (c) of a certain metal and the mass (m) of several bodies of that metal?

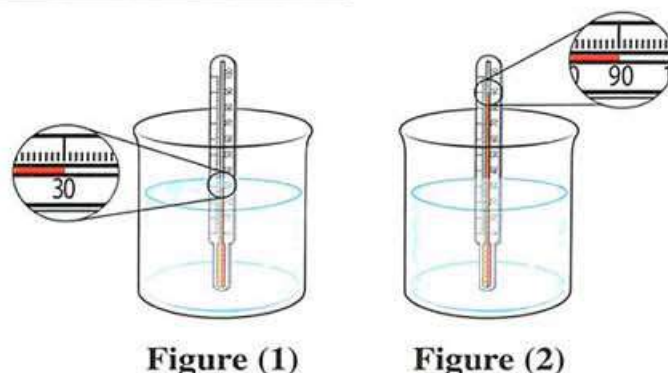


- 59 If you know that the specific heat of glass in $\text{J/kg}^\circ\text{C}$ is 840, then it is equivalent in J/kg.K to
- (a) 1113 (b) 840 (c) 567 (d) 3.08

- 60 A body with a mass of 150 g absorbed an amount of heat of 8100 J, so its temperature rose from 30°C to 90°C . Using the opposite table, what is the substance of this body?
- (a) Copper. (b) Aluminum.
(c) Iron. (d) Lead.

The substance	Specific heat (J/kg.K)
Copper	390
Aluminum	900
Iron	450
Lead	128

- 61 * A beaker contains 325 g of water as shown in figure (1). If the specific heat of water is 4200 J/kg.K , so the amount of heat required to raise the temperature of water to be as shown in figure (2) is
- (a) 38220 J (b) 81900 J
(c) 95550 J (d) 121485 J



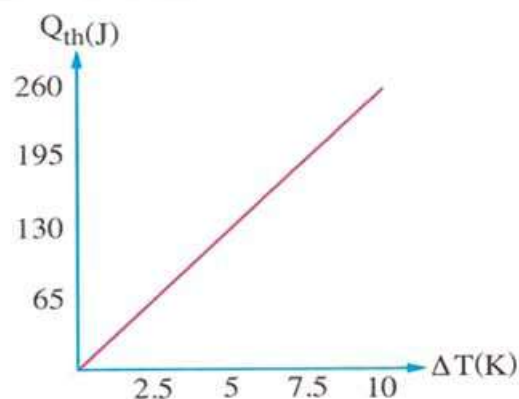
- 62 * The temperature of a piece of aluminum of mass 0.3 kg has changed from 20°C to 253 K, given that the specific heat of aluminum is 900 J/kg.K , the piece of aluminum has
- (a) absorbed an amount of heat of 10800 J (b) absorbed an amount of heat of 62700.3 J
(c) lost an amount of heat of 10800 J (d) lost an amount of heat of 62700.3 J

- 63 A body of mass 2 kg made of a material of specific heat $2 \times 10^3 \text{ J/kg.K}$. If its temperature was 27°C , then it has absorbed an amount of heat of 10^4 J , the temperature of the body

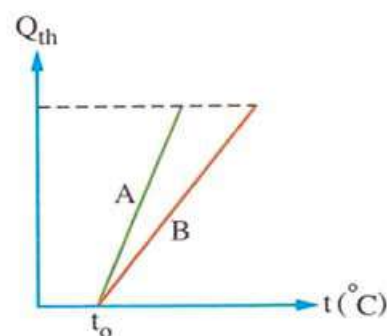
(a) rises to 325 K (b) rises to 325°C
(c) increases by 2.5 K (d) increases by 5 K

- 64 * The opposite graph represents the relation between the amount of heat (Q_{th}) absorbed by a piece of lead of mass 200 g and the change in its temperature (ΔT), so the specific heat of lead is

(a) 120 J/kg.K
(b) 125 J/kg.K
(c) 130 J/kg.K
(d) 135 J/kg.K

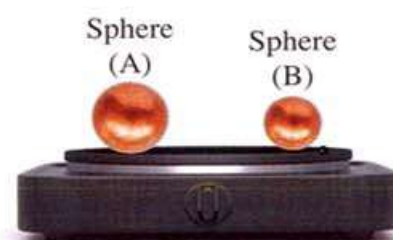


- 65 Two quantities of two liquids A and B with the same mass were heated from a temperature t_0 and the opposite graph represents the relation between the amount of heat (Q_{th}) absorbed by each liquid and its temperature (t), so which liquid has a higher specific heat?



(a) Liquid A.
(b) Liquid B.
(c) The two liquids have the same specific heat.
(d) The answer cannot be determined.

- 66 * Two solid copper spheres A and B are placed together on an electric hot plate as shown in the opposite figure. Which sphere will have a higher temperature increase during the same period of time?



(a) Sphere (A).
(b) Sphere (B).
(c) Both spheres will have the same temperature increase.
(d) The answer cannot be determined.

- 67 A mass (m) of iron gained an amount of heat equal to $(X)\text{J}$ and its temperature was raised from 20°C to 50°C . If a mass (m) of water gained the same amount of heat of $(X)\text{J}$, then its temperature would rise by

(a) 30°C (b) greater than 30°C
(c) less than 30°C (d) The answer can't be determined

- 68 * The opposite table illustrates the specific heat of four different substances W, X, Y and Z of the same mass. If they gained the same amount of heat, the substance whose temperature rises by a greater amount is

The substance	specific heat (J/kg.°C)
W	450
X	390
Y	900
Z	128

(a) W (b) X (c) Y (d) Z

- 69 * Two solid bodies, (1) and (2), made of the same material with masses m_1 and m_2 , respectively, if each of them has absorbed an amount of heat Q so that their temperatures have increased by 5°C and 10°C respectively, the ratio of their masses $\left(\frac{m_1}{m_2}\right)$ is

(a) $\frac{1}{2}$ (b) $\frac{1}{1}$ (c) $\frac{2}{1}$ (d) $\frac{4}{1}$

- 70 * Two equal masses of liquids (a) and (b) of specific heat capacities c_a and c_b respectively, are miscible but doesn't react together. The temperatures of the two liquids were 80°C and 10°C , respectively. If the two liquids are mixed to reach thermal equilibrium at a final temperature 30°C , the ratio $\left(\frac{c_a}{c_b}\right)$ equals

(a) $\frac{1}{3}$ (b) $\frac{3}{1}$ (c) $\frac{2}{5}$ (d) $\frac{5}{2}$

- 71 The following figures show four aluminum bodies. The mass and initial temperature of each of them are recorded below it. If each of these bodies is placed separately in a beaker with the same quantity of water of temperature 10°C , which object will cause a greater increase in the temperature of the water?



10 g
 20°C

(a)



20 g
 10°C

(b)



30 g
 5°C

(c)



50 g
 20°C

(d)

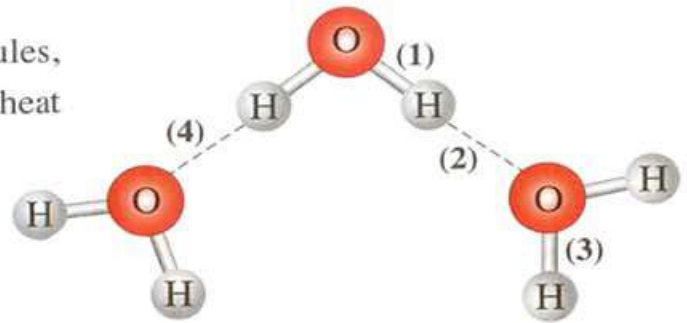
- 72 * A quantity of water of mass 0.5 kg is being heated such that it gains heat at a rate of 42000 J/min. If the specific heat of water is 4200 J/kg.K, then the time required to raise the temperature of this quantity of water from 25°C to 85°C equals

(a) 0.5 minutes (b) 1 minutes
(c) 3 minutes (d) 6 minutes

Specific heat of water

- 73 The opposite figure shows some water molecules, so the bonds responsible for the high specific heat of water are

- (a) (1), (2)
- (b) (1), (3)
- (c) (3), (4)
- (d) (2), (4)



- 74 The following figures represent the water molecules in three different physical states:



Figure (1)



Figure (2)

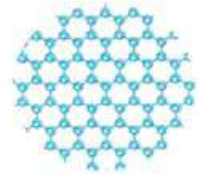


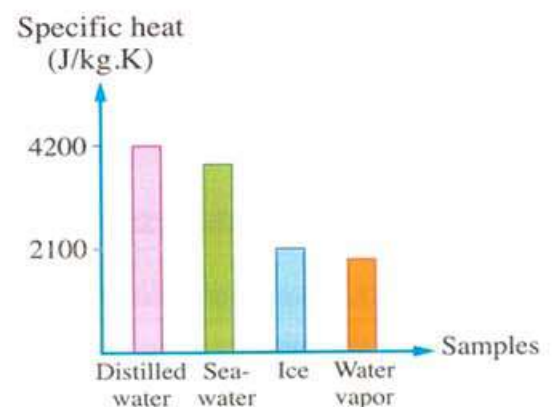
Figure (3)

Then the specific heat of water is

- (a) greatest in (1)
 - (b) greatest in (2)
 - (c) greatest in (3)
 - (d) equal in the three figures
- 75 Two equal masses of water and oil were at the same temperature in two identical containers. If the two containers are placed together on an electric hot plate, then the temperature of the oil reaches T in time t_o . Given that the specific heat capacity of water is greater than the specific heat capacity of oil, the temperature of the water will reach T in a time
- (a) greater than t_o
 - (b) less than t_o
 - (c) equal to t_o
 - (d) the answer cannot be determined

- 76 The opposite figure shows the specific heat capacities of four different samples of the same mass. Which of these samples requires a greater amount of heat to raise its temperature by 1 K?

- (a) The sample of water vapor.
- (b) The sample of ice.
- (c) The sample of seawater.
- (d) The sample of distilled water.



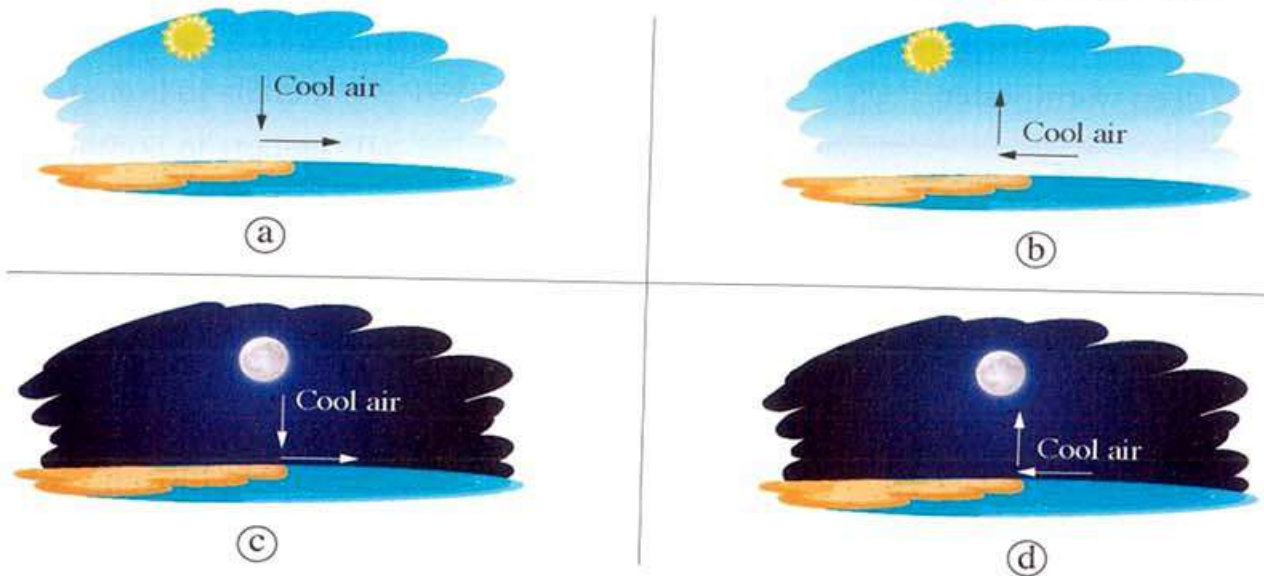
77 Which of the following properties has a high value that is responsible for the slow change in water temperature in large water bodies?

- (a) Density of water. (b) Salinity of water.
(c) Specific heat of water. (d) pH value of water.

78 Which of the following substances, a unit mass of it has the capacity to store thermal energy for a longer period of time immediately after sunset?

- (a) Oceans. (b) Coastal sands.
(c) Atmospheric air. (d) Mountain rocks.

79 Which of the following diagrams shows the mechanism of sea breeze formation?



80 Figures (1) and (2) represent a coastal area during the day and night, respectively,

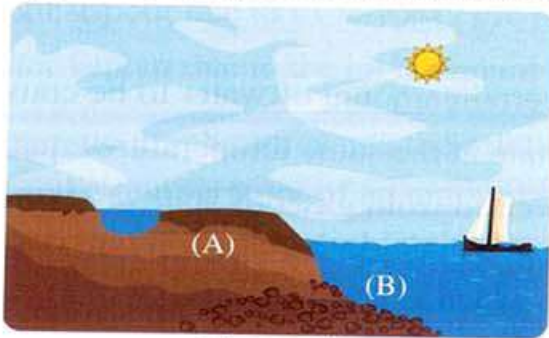


Figure (1)

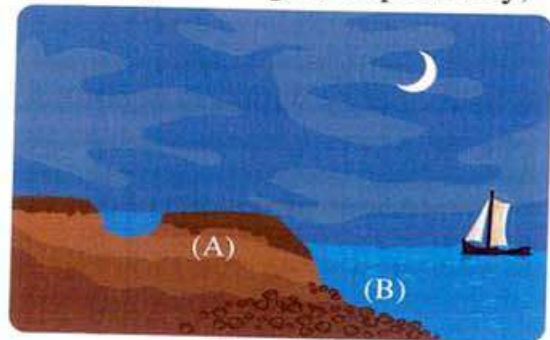


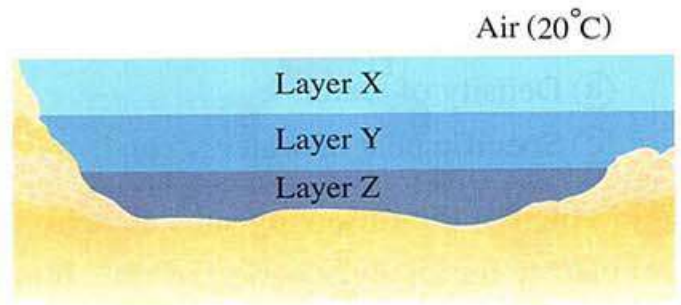
Figure (2)

Which of the following conclusions is correct about the temperature of spot (A) compared to spot (B)?

	In figure (1)	In figure (2)
(a)	Higher	Higher
(b)	Higher	Lower
(c)	Lower	Higher
(d)	Lower	Lower

- 81 The opposite figure shows a cross-section of ocean water. Which layer in the figure is distinguished as the most stable in terms of temperature compared to the other layers?

(a) Layer X.
 (b) Layer Y.
 (c) Layer Z.
 (d) Layers X and Y.



- 82 The most suitable marine environment for coral reef prosperity is

(a) the shallow warm water
 (b) the shallow cold water
 (c) the deep warm water
 (d) the deep cold water

— Latent heat of vaporization

- 83 The latent heat of vaporization is the heat energy which is absorbed by a unit mass of the material

(a) to increase its temperature by 1 K.
 (b) to decrease its temperature by 1 K.
 (c) during its conversion from liquid to gas without change in temperature.
 (d) during its conversion from solid to liquid without change in temperature.

- 84 Measuring unit of the latent heat of vaporization is

(a) J
 (b) J/kg
 (c) J/K
 (d) J/kg.K

- 85 If the heat energy which is absorbed by a certain amount of water to be converted from the liquid state at 100°C to gaseous state at the same temperature equals (E), so the same amount of water vapor to be converted from gaseous state at 100°C to the liquid state at the same temperature, it must

(a) absorb the same amount of heat energy (E)
 (b) absorb amount of heat energy greater than (E)
 (c) emit the same amount of heat energy (E)
 (d) emit amount of heat energy less than (E)

- 86 An amount of water of mass 10 kg needs an amount of heat energy (E) to be converted from liquid water at 100°C into water vapor at the same temperature, so the latent heat of vaporization equals

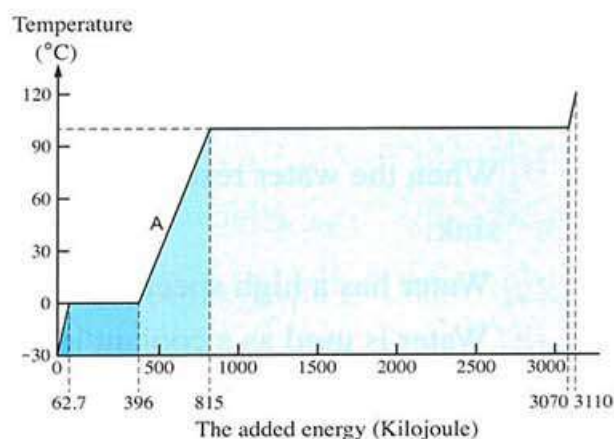
(a) E
 (b) 10 E
 (c) $\frac{E}{10}$
 (d) $\frac{E}{100}$

- 87 The latent heat of vaporization of water
- (a) is high due to the strong covalent bonds between the oxygen and hydrogen atoms.
 - (b) is high due to the strong hydrogen bonds between the water molecules.
 - (c) is low due to the weakness of the covalent bonds between the oxygen and hydrogen atoms.
 - (d) is low due to the weakness of the hydrogen bonds between the water molecules.
- 88 Two students, each of them used a method to cool his warm drink as follows:
 Method of student (I) : he added 25 g of cold water at 0°C to the drink.
 Method of student (II) : he added 25 g of ice at 0°C to the drink.
 Which of the two methods is more efficient in cooling the drink?
- (a) Method of student (I).
 - (b) Method of student (II).
 - (c) Both methods are equivalent since the added mass is constant.
 - (d) Both methods are equivalent because both of water and ice are at 0°C
- 89 Which causes more severe skin burns, being exposed to water vapor of 100°C or being exposed to liquid water at the same temperature?
 (Where: the skin is exposed to the same amount of water and water vapor for the same interval of time).
- (a) Liquid water due to its high specific heat.
 - (b) Liquid water due to the high amount of heat which it emits during boiling.
 - (c) Water vapour due to its low specific heat.
 - (d) Water vapour due to the high amount of heat which it emits at condensation.

- 90 The opposite graph represents the relation between the temperature of an amount of water and the heat energy which is absorbed by that amount, if the amount of heat energy which is absorbed by an amount of water to increase its temperature from 0°C to 100°C is (E_1) and the amount of heat energy which is absorbed by the same amount of water to be converted from liquid to vapour without changing its temperature equals (E_2),

so

- (a) $E_1 > E_2$
- (b) $E_1 < E_2$
- (c) $E_1 = E_2$
- (d) the answer is indeterminable.



Second Miscellaneous Questions

1 Write the scientific term for each of the following statements:

- (a) Any substance that can flow and does not have a fixed shape but takes the shape of its container.
- (b) The mass of a unit volume of a substance.
- (c) The ratio of the density of a certain substance to the density of pure water at 4°C.
- (d) The sum of kinetic and potential energies of the molecules of a body or a system.
- (e) - A quantitative description of the hotness or coldness of a body or a system.
- A measure of the average kinetic energy of the molecules of a body or a system.
- (f) The thermal energy transferred from, to or through a body when there is a difference in temperature.
- (g) The amount of heat required to raise the temperature of 1 kg of a substance by 1 degree Celsius.
- (h) Organisms that sustain their internal body temperature, independent of the surrounding environment.
- (i) Organisms that depend on external sources to regulate their body temperature.
- (j) The emitted heat energy from a unit mass of the substance during its conversion from gaseous state into liquid state without change in temperature.

2 Give reasons for:

- (a) The density of a pure substance does not change when the mass or volume of the sample taken from it changes.
- (b) Density has a unit of measurement, while relative density has no unit of measurement.
- (c) The presence of mercury in the hydrometer bulb.
- (d) The freezing of lake water in polar regions begins at the surface rather than the bottom.
- (e) Fish live without freezing in frozen lakes or rivers.
- (f) When the water resulting from the melting of ice enters the ocean, it floats and doesn't sink.
- (g) Water has a high specific heat compared to other liquids.
- (h) Water is used as a coolant in car engines and factories.
- (i) Large bodies of water moderate the temperature of their surrounding areas.
- (j) The high latent heat of vaporization of water.
- (k) The importance of the high latent heat of vaporization of water for the living organisms.

3 What happens when increasing the temperature of a body, "concerning: its density"?

4 Compare between each of the following:

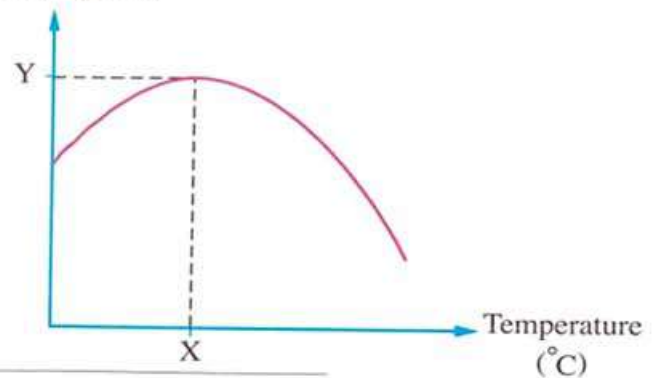
- (a) Temperature and amount of heat (**in terms of:** definition and international unit of measurement).
- (b) Celsius scale and Kelvin scale in terms of: freezing point and boiling point of water.
- (c) Warm blooded organisms and cold-blooded organisms in terms of: the method of regulating their body temperature - examples.

5 Mention the factors affecting each of:

- (a) The density of the pure substance.
- (b) The amount of heat lost or gained by a substance when its temperature changes.

6 The opposite figure represents the relation Density (kg/m^3)

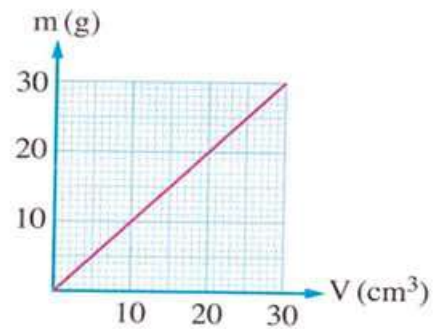
between the density of pure water in (kg/m^3) and temperature in ($^{\circ}\text{C}$), so **what** is the value of each of X, Y in the figure?



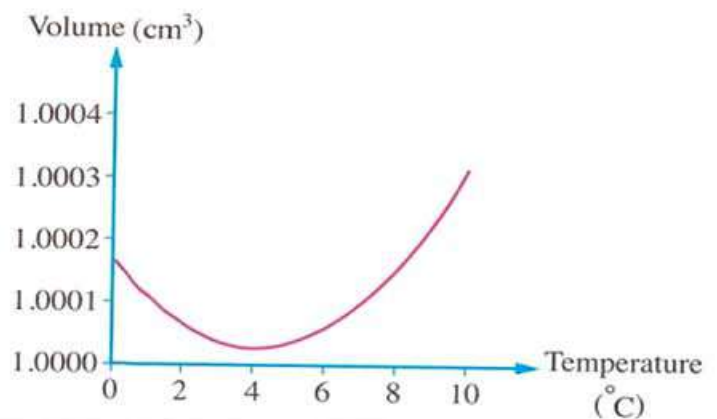
7 The opposite graph represents the relation between the mass (m) of different quantities of pure water and the volume (V) of each at a constant temperature.

What do you expect to be:

- (a) The temperature of the water? **Explain.**
- (b) The mass of 500 cm^3 of water at the same temperature?



8 Analyze the opposite graph and **deduce what happens to** the water density with the change in temperature.

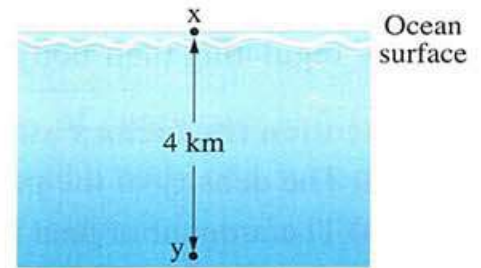


9 Explain how the behavior of water differs from other liquids when studying the effect of changing temperature on density.

10 Give an example of how the changes in temperature and water density can affect living organisms in an aquatic environment.

- 11 **How** can you increase the density of water that was at room temperature in two methods?
- 12 **Mention** the factors that affect the density of water in the oceans and **explain** the effect of each.

- 13 In the opposite figure, **explain** why the density of water at point y is greater than at point x.



- 14 **Analyze** the data presented in the opposite table, then answer the following questions:

Substance	Temperature (°C)	Physical state	Specific heat (J/kg.K)
Air	25	Gas	1005
Lead	25	Solid	128
Pure water	25	Liquid	4200
Water vapor	100	Gas	2020
Ice	0	Solid	2100

- (a) **What** are the factors on which the specific heat of matter depends?
- (b) **Which** of the three states of water has the greatest value of specific heat?
- 15 Considering the different specific heats of land and seawater, **explain** the phenomenon of the sea breeze.

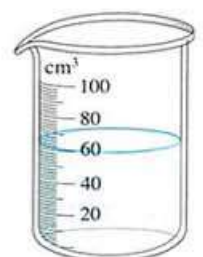
- 16 On the opposite figure, **draw** arrows to indicate the directions of the air currents, **identifying** which of these currents represents the sea breeze.



- 17 **Explain why** the specific heat of water is a critical factor in the sustainability of marine life.
- 18 Assuming that the specific heat of water is low, **what** would be the impact of that on marine life? (one effect is enough)

- 19 If the relative density of aluminum is 2.7 and the density of water at 4°C is 10^3 kg/m^3 , **calculate** the density of aluminum.

- 20 **The opposite figure** shows a graduated beaker containing a sample of canal water. When a hydrometer is placed in the sample, it shows that the relative density of the sample is 1.02. **What** is the mass of the canal water sample in the beaker?



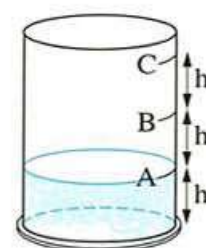
- 21 A quantity of pure water whose volume at a temperature of 4°C equals 1 m^3 is cooled until it freezes, **calculate** the increase in its volume when it turns into ice of density 917 kg/m^3
- 22 If you know that the boiling point of ethyl alcohol is 78° on the Celsius scale, **calculate** its boiling point on the Kelvin scale.
- 23 **What** is the value on the Kelvin scale that is equal to four times its corresponding value on the Celsius scale?
- 24 A copper piece of mass 0.3 kg had temperature of 20°C . If it absorbed an amount of heat of 5850 J , **calculate** its final temperature. (Given that: the specific heat of copper is 390 J/kg.K).
- 25 A piece of aluminum its temperature is 30°C gained amount of heat of 500 J , so its temperature rose to 310 K . **Calculate** the mass of aluminum piece. (Given that: the specific heat of aluminum is 900 J/kg.K).
- 26 50 kg of hot water whose temperature is 90°C was added to 20 kg of cold water whose temperature is 20°C , **determine** the final temperature of water.

Questions that measure high levels of thinking

Answered in detail

Choose the correct answer:

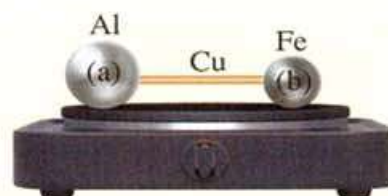
- 1 A flask containing a sample of seawater was placed on the pan of a balance. The reading of the balance for the water and the flask together was 100 g , as shown in the figure. Knowing that the density of seawater is 1030 kg/m^3 , what do you expect the volume of the sample to be?
- (a) Greater than 97 cm^3 (b) Equal to 97 cm^3
 (c) Less than 97 cm^3 (d) Cannot be determined.
- 2 The opposite figure shows a container containing an amount of liquid X of relative density 2 with a mass m . If an amount of liquid Y of relative density 1 is added to the container with a mass m and does not mix with the first liquid, the surface level of liquid Y will settle
- (a) at level B (b) at level C
 (c) between levels A and B (d) between levels B and C



- 3 Two identical containers (1) and (2) contain equal quantities of pure water at temperatures t_1 and t_2 , respectively. The temperatures of both containers increased by one degree, causing an increase in the density of water in container (1) and a decrease in the density of water in container (2). Which of the following could represent the temperatures t_1 , t_2 respectively?

(a) 1°C , 3°C (b) 4°C , 6°C (c) 3°C , 6°C (d) 6°C , 3°C

- 4 Two solid spheres, (a) and (b), of the same mass were at the same temperature. Sphere (a) is made of aluminum and sphere (b) is made of iron, then the two spheres are placed on an electric hot plate for a while. If the spheres are connected together by a copper rod as shown in the opposite figure, in which direction does heat flow through the copper rod? (Given that: $c_{\text{Al}} > c_{\text{Fe}}$)



- (a) From sphere (a) to sphere (b).
 (b) From sphere (b) to sphere (a).
 (c) No heat flows between the two spheres.
 (d) Heat flows equally between the two spheres.

- 5 The opposite table shows the specific heat capacities of some materials, so from the following masses of these materials, which mass requires the least amount of thermal energy to change its temperature by 2 K?

The material	Specific heat (J/kg.K)
Copper	390
Iron	450
Aluminum	900
Water	4200

- (a) 250 grams of copper.
 (b) 225 grams of iron.
 (c) 100 grams of aluminum.
 (d) 50 grams of water.

- 6 An insulated aluminum container of mass 20 g contains 150 g of water at a temperature of 20°C . A piece of a metal of mass 96 g and temperature 100°C is dropped into water. If the final temperature of the system is 25°C and the specific heat capacities of water and aluminum are 4200 J/kg.K and 900 J/kg.K , respectively, then the specific heat capacity of the metal of the dropped piece equals.....

- (a) 450 J/kg.K (b) 720 J/kg.K
 (c) 960 J/kg.K (d) 1440 J/kg.K

Questions ?

Unit 1 | Lesson 4

Answered

Aqueous Solutions and their Properties

Interactive test



First

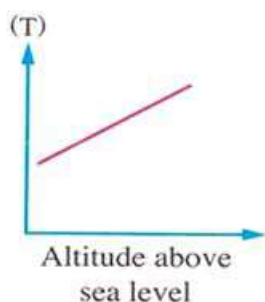
Multiple Choice Questions

Questions signed by * are answered in detail.

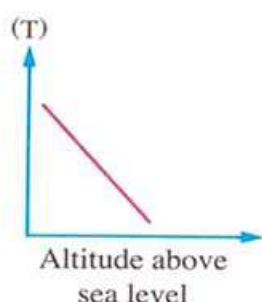
- 1 Which of the following expresses water in all water bodies on the Earth's surface?
 - (a) It exists in a pure form.
 - (b) It contains dissolved or suspended substances.
 - (c) It has the same temperature.
 - (d) It has the same degree of salinity.
- 2 Which of the following is from the colligative properties of aqueous solutions?
 - (a) Elevation of vapor pressure.
 - (b) Depression in boiling point.
 - (c) Elevation of freezing point.
 - (d) Osmotic pressure.
- 3 The colligative properties of aqueous solutions depend on
 - (a) nature of solvent
 - (b) nature of solute
 - (c) volume of solution
 - (d) number of solute molecules
- 4 What happens to the vapor pressure of an aqueous solution when increasing the concentration of the solute?
 - (a) It decreases.
 - (b) It increases.
 - (c) It isn't affected.
 - (d) It vanishes.
- 5 The liquid starts to boil when its vapor pressure is
 - (a) less than the pressure exerted on it
 - (b) greater than the pressure exerted on it
 - (c) equal to the pressure exerted on it
 - (d) double the pressure exerted on it
- 6 What happens to the vapor pressure of the liquid when its temperature increases in a closed system?
 - (a) It increases.
 - (b) It decreases.
 - (c) It isn't affected.
 - (d) It vanishes.
- 7 * At the standard atmospheric pressure, if the boiling point of a pure solvent = $X^{\circ}\text{C}$, the boiling point of the solution that produced from dissolving one of its salts in it is
 - (a) equal to $X^{\circ}\text{C}$
 - (b) greater than $X^{\circ}\text{C}$
 - (c) less than $X^{\circ}\text{C}$
 - (d) equal to $\frac{1}{2} X^{\circ}\text{C}$

- 8 When does the liquid reach the dynamic equilibrium state?
 (a) When the evaporation rate is higher than the condensation rate.
 (b) When the evaporation rate is equal to the condensation rate.
 (c) When the condensation rate is greater than the evaporation rate.
 (d) When evaporation continues and condensation vanishes.
- 9 What are the consequences of using salt or sugar in preserving some beverages?
 (a) Increasing the liquid vapor pressure. (b) Decreasing the liquid vapor pressure.
 (c) Improving the taste only. (d) Decreasing the liquid boiling point.
- 10 Which of the following factors **doesn't** affect the boiling point of the solution?
 (a) Atmospheric pressure. (b) Concentration of the solution.
 (c) Volume of the solution. (d) The number of solute ions.
- 11 What is the effect of increasing the number of solute molecules in the solution on the solution boiling point and its osmotic pressure respectively?
 (a) Increases / Increases. (b) Decreases / Decreases.
 (c) Increases / Decreases. (d) Decreases / Increases.
- 12 Which of the following sugar solutions has the highest boiling point?
 (a) Solution of concentration 10 g/L (b) Solution of concentration 5 g/L
 (c) Solution of concentration 9 g/L (d) Solution of concentration 1 g/L

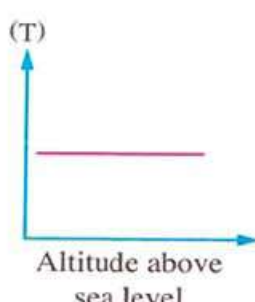
- 13 Which of the following graphs represents the relation between the boiling point of pure water (T) and the altitude above sea level?



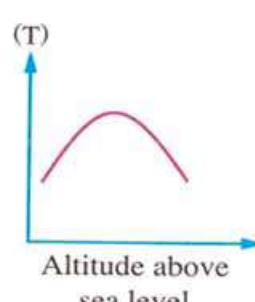
(a)



(b)



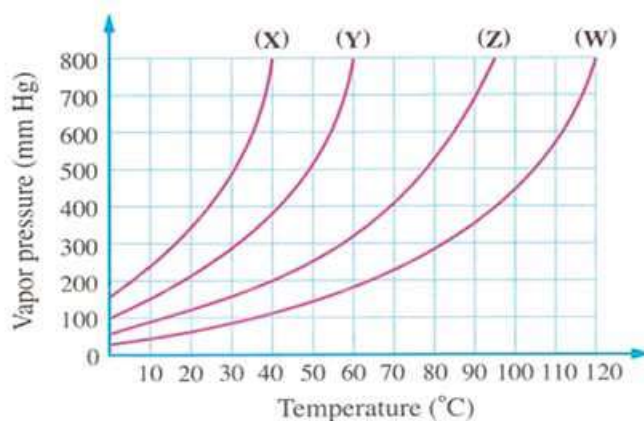
(c)



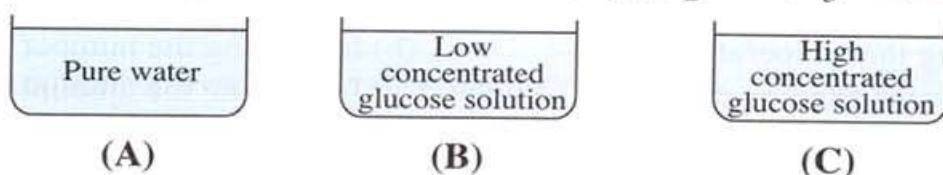
(d)

- 14 * If the freezing point of a pure solvent is 0°C , what will be the freezing point if 5g of salt is dissolved in it?
 (a) Less than 0°C (b) Higher than 0°C (c) Equals 0°C (d) $0^{\circ}\text{C} : 4^{\circ}\text{C}$
- 15 If the boiling point of a solution at a mountaintop is 108°C , therefore the boiling point of the same solution on the Earth's surface is
 (a) 106°C (b) 104°C (c) 108°C (d) 110°C
- 16 What is the reason for the depression in the freezing point of an aqueous solution comparing to the freezing point of pure water?
 (a) The attraction forces between the solute molecules and water molecules obstruct the freezing.
 (b) Pure water contains a larger number of dissolved molecules.
 (c) Dissolved salts in the solution reduce its osmotic pressure.
 (d) Decreasing the vapor pressure of pure water.

- 17 Why are salts spread on roads in cold regions after rainfall?
- Due to the decrease in the freezing point of the salt solution.
 - Due to the increase in the freezing point of the salt solution.
 - Due to the increase in the vapor pressure of water.
 - Due to the decrease in the vapor pressure of water.
- 18 The solution is characterized from pure solvent by
- having low vapor pressure
 - the depression in the boiling point
 - the absence of osmotic pressure
 - the elevation of the freezing point
- 19 Which of the following its increase leads to decreasing the vapor pressure of solutions?
- Number of solvent molecules.
 - Number of solute molecules.
 - Temperature.
 - The amount of solution.
- 20 Which of the following statements is correct?
- The number of water vapor molecules that are released from solutions is less than that released from pure water under the same conditions.
 - Attraction forces among water molecules each other are stronger than the attraction forces between water molecules and solute molecules.
 - The vapor pressure value in solutions is greater than its value in case of pure water.
 - The depression in vapor pressure is inversely proportional to the number of solute ions in the solution.
- 21 * The following solutions have equal concentrations, which of them has the least vapor pressure?
- NaCl
 - CuCl_2
 - $\text{Al}(\text{NO}_3)_3$
 - HCl
- 22 If the boiling point of acetic acid at 1 atm pressure equals 118°C , it is expected that its boiling point at 0.8 atm pressure equals
- 111°C
 - 118°C
 - 119°C
 - 125°C
- 23 * The opposite graph expresses the relation between the vapor pressure of four pure liquids (X), (Y), (Z) and (W) at different temperatures, which liquid whose boiling point is the highest at standard atmospheric pressure?
- (X).
 - (Y).
 - (Z).
 - (W).



- 24 The probability of water molecules evaporation in solutions decreases compared to pure water due to
- increasing the attraction forces among water molecules
 - decreasing the attraction forces among water molecules
 - the presence of attraction forces between water and solute molecules
 - the absence of attraction forces between water and solute molecules
- 25 * At higher altitudes above sea level, which of the following is correct about the boiling point of pure water?
- It decreases as the atmospheric pressure increases.
 - It decreases as the atmospheric pressure decreases.
 - It increases as the atmospheric pressure decreases.
 - It increases as the atmospheric pressure increases.
- 26 The boiling point of pure water inside the pressure cooking pot may be
- 125°C
 - 100°C
 - 90°C
 - 80°C
- 27 In which of the following cases does the boiling point of pure water decrease?
- Inside the pressure cooking pot.
 - When adding table salt to it.
 - At the top of a mountain.
 - When the atmospheric pressure increases.
- 28 Two solutions (X) and (Y) of the same salt, if the boiling point of solution (X) is higher than the boiling point of solution (Y), therefore
- the salt concentration in solution (X) is greater
 - the pressure on the surface of solution (X) is lower
 - the salt concentration in solution (Y) is greater
 - the pressure on the surface of solution (Y) is higher
- 29 The following figures represent three beakers (A), (B) and (C) containing equal amounts of liquids, if the boiling point of each of them is (T_1), (T_2) and (T_3) respectively:



Which of the following relationships is correct?

- $T_1 > T_2 > T_3$
 - $T_1 < T_2 < T_3$
 - $T_1 = T_2 = T_3$
 - $T_2 < T_1 < T_3$
- 30 In which of the following cases does the pure water boil quickly before its temperature reaches 100°C?
- Being at the top of a mountain.
 - The presence in a low valley.
 - Being at sea level.
 - Putting water in a pressure cooking pot.

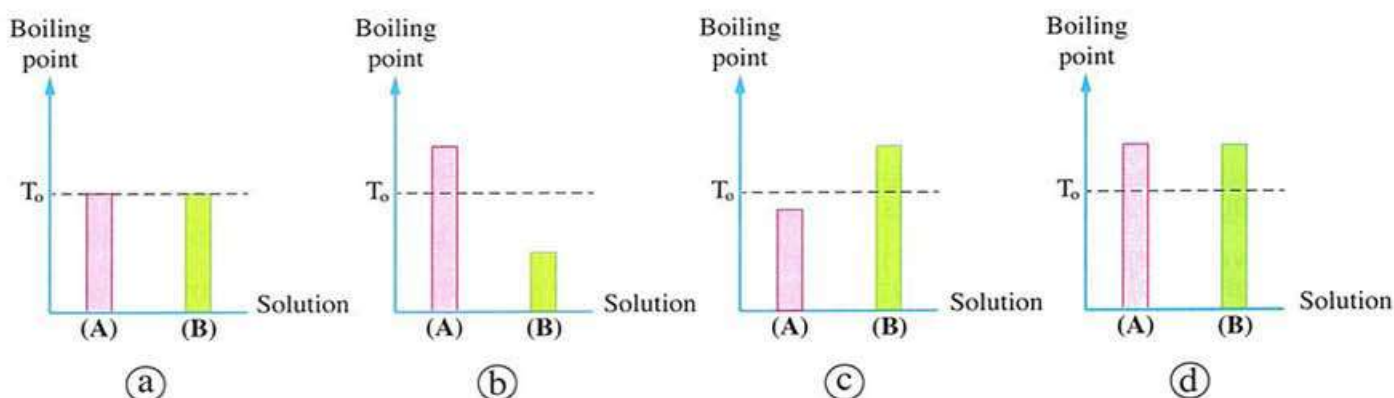
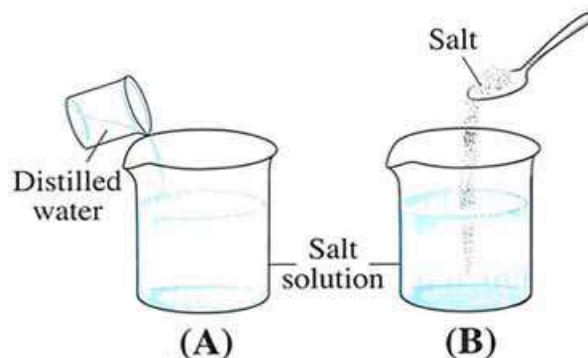
- 31 * When comparing between two equal concentrations of $\text{Al}_2(\text{SO}_4)_3$ and $\text{Al}(\text{NO}_3)_3$ solutions, the boiling point and vapor pressure of aluminum sulphate solution according to aluminum nitrate solution are and respectively.
 (a) lower - higher (b) higher - lower (c) higher - higher (d) lower - lower
- 32 * The freezing point of a certain concentration from magnesium chloride solution (MgCl_2) is that of the same concentration from potassium nitrate solution (KNO_3).
 (a) greater than (b) less than
 (c) equal to (d) no correct answer
- 33 By increasing the number of ions of the non-volatile dissolved substances in water, all of the following is correct **except**
 (a) the vapor pressure decreases (b) the freezing point decreases
 (c) the osmotic pressure decreases (d) the boiling point increases
- 34 On adding 50 mL pure water to 100 mL salt solution, then
 (a) the boiling point of the solution decreases and its vapor pressure decreases
 (b) the freezing point of the solution decreases and its boiling point increases
 (c) the vapor pressure of the solution increases and its osmotic pressure increases
 (d) the freezing point of the solution increases and its vapor pressure increases
- 35 Assuming that a liquid boils at 90°C , if it is exposed to high pressure, its boiling point can be
 (a) 82°C (b) 90°C (c) 110°C (d) 70°C
- 36 * The following solutions are of equal concentrations, which of them has the highest freezing point?
 (a) NaCl (b) CaCl_2 (c) $\text{Al}_2(\text{SO}_4)_3$ (d) AlCl_3
- 37 What is the effect of increasing the number of solute molecules in a certain volume of pure water on each of the freezing and boiling points respectively?
 (a) Increases / Increases. (b) Increases / Decreases.
 (c) Decreases / Decreases. (d) Decreases / Increases.
- 38 Which of the following choices increases the osmotic pressure of a solution?
 (a) Decreasing the temperature. (b) Increasing the number of solute ions.
 (c) Decreasing the concentration of the solution. (d) Increasing the amount of solvent.
- 39 From the opposite table:
 (1) What is the liquid whose vapor pressure is the highest at room temperature (25°C)?
 (a) Water. (b) Acetone.
 (c) Acetaldehyde. (d) Acetic acid.
 (2) What is the liquid whose vapor pressure is the least at room temperature (25°C)?
 (a) Water. (b) Acetone.
 (c) Acetaldehyde. (d) Acetic acid.

Compound	Boiling point ($^\circ\text{C}$) at standard atmospheric pressure
Water	100
Acetone	56
Acetaldehyde	31
Acetic acid	118

- 40 * The boiling point of a liquid inside the pressure cooking pot is its boiling point at atmospheric pressure of 0.5 atm.

(a) greater than (b) less than (c) equal to (d) half

- 41 * In the opposite figure, there are two beakers containing two equal volumes of the same salt solution and its boiling point is (T_0). If an amount of distilled water was added to beaker (A) and an amount of salt is added to beaker (B), which of the following graphs may express correctly the boiling point of the solution in the two beakers after the additions?

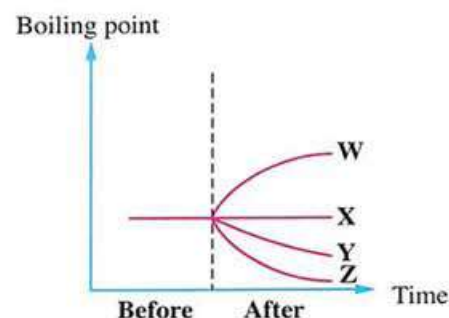


- 42 The boiling point of two amounts of pure water is measured at two different regions (A) and (B), if the boiling point of the amount of water at region (A) is higher than that at region (B). What is the ratio between the two values of the atmospheric pressures that exerted on the two amounts of water at regions (A) and (B) respectively?

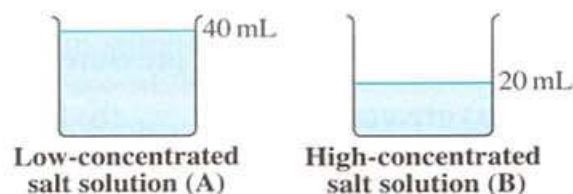
(a) Greater than one. (b) Less than one.
(c) Equals one. (d) Can't be identified.

- 43 From the opposite figure, which of the following represents the change resulting from the addition of 25 g of sodium chloride to 200 mL of pure water during period of time?

(a) W (b) X
(c) Y (d) Z

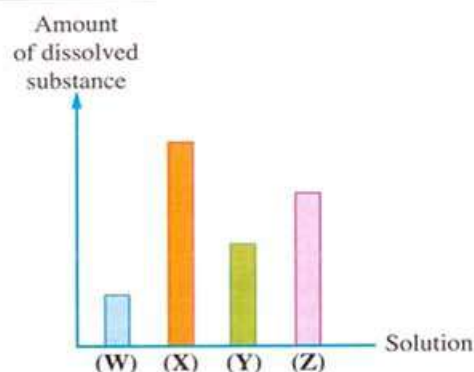


- 44 * The opposite figure illustrates two samples of table salt solutions (A) and (B) with different concentrations, which of the following choices is correct when comparing the boiling point of solution (B) with the boiling point of solution (A)?



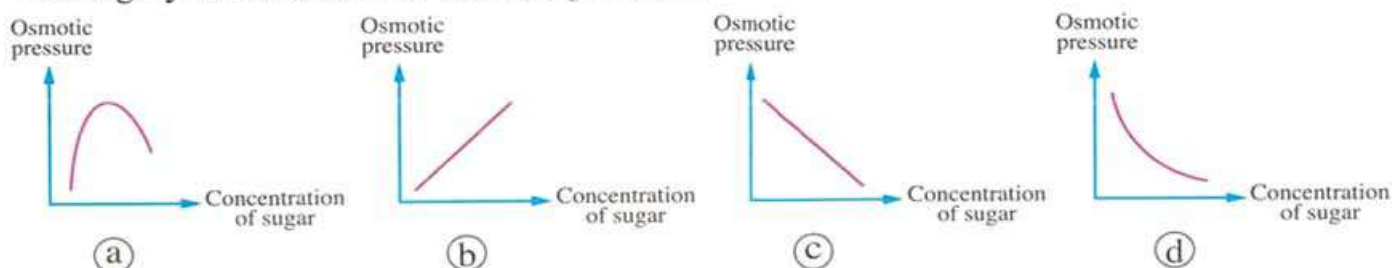
- (a) (B) is higher / As the volume of the solution is lower.
 (b) The boiling point of the two solutions is equal.
 (c) (B) is higher / As the concentration of the solution is higher.
 (d) (A) is higher / As the volume of the solution is larger.
- 45 Which of the following represents a correct arrangement for the osmotic pressure of three water samples from different sources at 25°C?
- (a) Fresh water > Distilled water > Salt water.
 (b) Fresh water = Distilled water > Salt water.
 (c) Salt water > Fresh water > Distilled water.
 (d) Salt water > Fresh water = Distilled water.

- 46 The opposite graph represents four solutions of equal volumes and dissolved in it different amounts of sodium chloride salt. Which of the following represents the arrangement of the solutions according to their osmotic pressure?



- (a) $W > X > Y > Z$ (b) $X > Z > Y > W$
 (c) $W > Y > Z > X$ (d) $X > Y > Z > W$
- 47 Which of the following has the highest osmotic pressure?
- (a) Low-concentrated solution. (b) High-concentrated solution.
 (c) Pure liquid whose temperature is high. (d) Pure liquid whose temperature is low.
- 48 As the osmotic pressure of the solution increases, its vapor pressure
- (a) vanishes (b) increases (c) decreases (d) isn't affected

- 49 Which of the following graphs illustrates the relation between the concentration of sugar in a sugary solution and its osmotic pressure?



- 50 The difference between the osmotic pressure of two solutions leads to the diffusion of water through semi-permeable membrane from the solution that is characterized by
- (a) having high osmotic pressure
 - (b) having a high concentration of solute
 - (c) having low osmotic pressure
 - (d) having a low concentration of water

Second Miscellaneous Questions

1 Write the scientific term for each of the following statements:

- (a) A homogeneous mixture of solvent and solute.
- (b) The properties of the solution that depend on the number of the non-volatile dissolved substance molecules or ions in the solution not on its type.
- (c) The vapor pressure of the liquid at the dynamic equilibrium between the liquid and its vapor.
- (d) The rate of liquid evaporation is equal to the rate of its vapor condensation at constant temperature and pressure at closed system.
- (e) The temperature at which the vapor pressure of the liquid is equal to the atmospheric pressure exerted on its surface.
- (f) The phenomenon of transferring the water molecules from a diluted solution to the concentrated solution through a semi-permeable membrane that separates between the two solutions.
- (g) The pressure that causes the transfer of water from low-concentrated solution to high-concentrated solution through semi-permeable membrane.

2 Give reasons for:

- (a) The vapor pressure of the solution is always lower than the vapor pressure of the pure solvent forming it.
- (b) The boiling point of the aqueous solution is higher than the boiling point of pure water at the standard atmospheric pressure.
- (c) Large amounts of salt are spread on roads in cold countries at rainfall.
- (d) The freezing point of the aqueous solution is always less than the freezing point of pure water.

3 What happens in each of the following cases:

- (a) The evaporation rate equals the condensation rate.
- (b) The vapor pressure of pure liquid equals the vapor pressure exerted on its surface.
- (c) Increasing the number of molecules of non-volatile dissolved substance in the solution "in terms of: the boiling and freezing points".

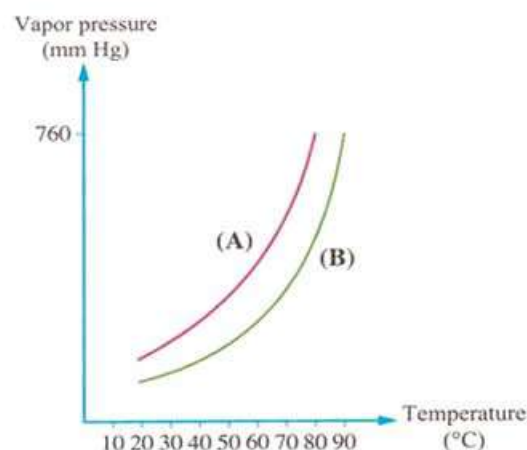
4 Compare between each of the following:

- (a) Pure water and aqueous solution "in terms of: the forces affecting the value of vapor pressure - the value of vapor pressure".
- (b) Boiling point of pure water when measured at mountaintop and inside a pressure cooking pot. **With explanation.**

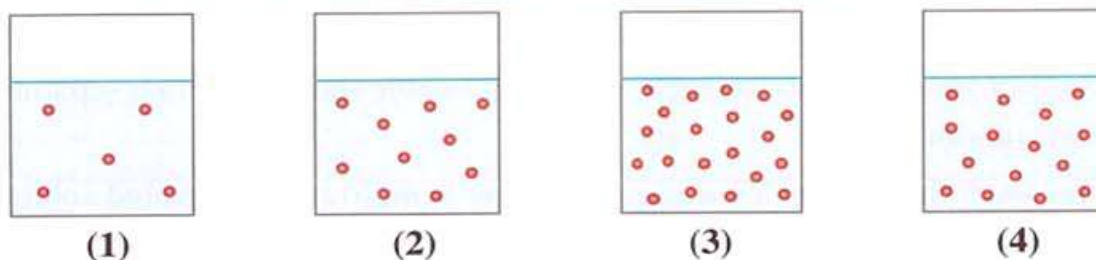
5 What is meant by the colligative properties of the solution? With determining them.

- 6** The opposite graph represents the relation between the vapor pressure and the temperature of two solutions (A) and (B) one of them is pure solvent and the other is solution. **Deduce** the symbol indicating each of the following:

- (a) Pure solvent.
- (b) Solution.

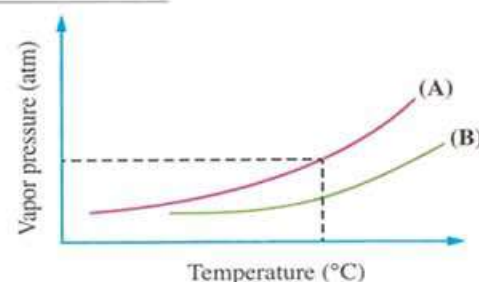


7 The following figures express four closed containers, each of them contains an aqueous solution containing the same non-volatile solute at the same temperature:



- (a) **Determine the number of the solution which has:**
- (1) The highest vapor pressure.
- (2) The highest boiling point.
- (b) **Arrange the solutions from (1) : (4) descendingly "according to: the freezing point".**

- 8** The opposite graph expresses the relation between the vapor pressure and the temperature of two pure liquids (A) and (B), **which** of them has the highest boiling point? **With explanation.**



- 9** If you have two liquids (X) and (Y), liquid (X) evaporates faster than liquid (Y) at 30°C:
- (a) **Which** of the two liquids has the highest vapor pressure at 30°C?
- (b) **Which** of the two liquids has the highest boiling point?

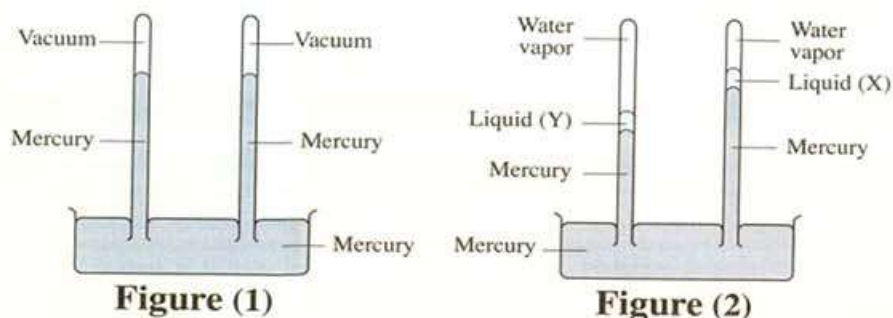
- 10 What is the relation between the number of solute molecules in the solution and its osmotic pressure? With explanation.**

Questions that measure high levels of thinking

Answered in detail

Choose the correct answer:

- 1 In the two opposite figures, two equal volumes of liquids (X) and (Y) were put in the two tubes of the apparatus illustrated in figure (1) each separately. So, the mercury level in the two tubes decreases as in figure (2), which of the following is correct?



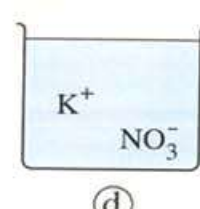
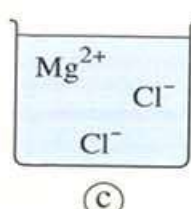
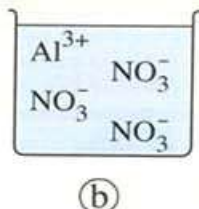
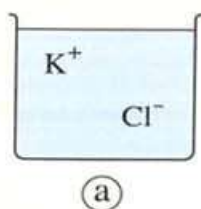
- (a) (X) represents distilled water / (Y) represents NaCl solution.
 (b) (X) represents river water / (Y) represents seawater.
 (c) (X) represents NaCl solution / (Y) represents distilled water.
 (d) (X) represents distilled water / (Y) represents ocean water.

- 2 On measuring the boiling point of three identical samples of table salt solution:

T_1	Represents the boiling point of the solution at standard atmospheric pressure.
T_2	Represents the boiling point of the solution at the top of a high mountain.
T_3	Represents the boiling point of the solution inside a pressure cooking pot.

Which of the following relations is correct?

- (a) $T_1 > T_2 > T_3$
 (b) $T_3 > T_2 > T_1$
 (c) $T_2 > T_1 > T_3$
 (d) $T_3 > T_1 > T_2$
- 3 If the following solutions are of equal concentration, which of them has the least freezing point?



- 4 If the vapor pressure of a liquid is equal to (X) and the atmospheric pressure exerted on it is (1.5 X), then the liquid
- (a) boils
 (b) volume increases
 (c) freezes
 (d) doesn't reach the boiling point

Questions ?

Unit

1

Lesson 5

Answered

Biological Importance of Water

Interactive
test



First

Multiple Choice Questions

Questions signed by * are answered in detail.

Cell

- 1 Which of the following isn't applied to the cell?
 - (a) It is the structural unit of the living organism.
 - (b) It is the functional unit of the living organism.
 - (c) It is the smallest independent constituent in the living organism.
 - (d) Its structure is similar in all living organisms.
- 2 Which of the following living organism(s) its/their cell wall contains peptidoglycan substance?
 - (a) Clams.
 - (b) Bacteria.
 - (c) Yeast.
 - (d) Bean plant.
- 3 Which of the following doesn't belong to eukaryotes?
 - (a) Corn plant.
 - (b) Sponge.
 - (c) Jellyfish.
 - (d) Bacteria.
- 4 Which of the following statements isn't applied to bacteria?
 - (a) They are prokaryotes.
 - (b) Their genetic material is surrounded by a nuclear membrane.
 - (c) Their cell walls contain peptidoglycan substance.
 - (d) They are unicellular organisms.
- 5 All eukaryotes are similar in containing
 - (a) large vacuole
 - (b) mitochondria
 - (c) cell wall
 - (d) chloroplasts
- 6 Which of the following kingdoms whose organisms are often aquatic?
 - (a) Protista.
 - (b) Fungi.
 - (c) Plantae.
 - (d) Animalia.
- 7 Fungi and protozoa are similar in that all of them
 - (a) contain cell wall
 - (b) are heterotrophic
 - (c) are aquatic
 - (d) are unicellular
- 8 The cell wall in fungi consists of
 - (a) peptidoglycan
 - (b) cellulose
 - (c) chitin
 - (d) pectin

- 9 All the following are heterotrophic organisms, **except**
 (a) protozoa (b) yeast fungus (c) golden algae (d) starfish
- 10 Which of the following kingdoms all its organisms are autotrophic?
 (a) Protista. (b) Plantae. (c) Animalia. (d) Fungi.
- 11 Which of the following is a characteristic of kingdom Animalia?
 (a) All its organisms are unicellular.
 (b) All its organisms are autotrophic.
 (c) Most of its organisms are capable to move.
 (d) Most of its organisms are prokaryotes.
- 12 Which of the following living organisms has no backbone?
 (a) Tilapia fish. (b) Frog. (c) Honey bee. (d) Plover.
- 13 Which of the following organisms belongs to coelenterates?
 (a) Jellyfish. (b) Starfish. (c) Sponge. (d) Clam.
- 14 All the following are from vertebrates, **except**
 (a) fish (b) amphibians (c) reptiles (d) arthropods
- 15 Insects belong to
 (a) coelenterates (b) arthropods
 (c) mollusks (d) echinoderms

Cell structure in eukaryotes

- 16 Which of the following are common between plant cells, fungi and bacteria?
 (a) Cell wall and plasma membrane.
 (b) Cell wall and sap vacuoles.
 (c) Mitochondria and chloroplasts.
 (d) Sap vacuoles and chloroplasts.
- 17 Which of the following structures exist(s) in all living cells?
 (a) Nuclear membrane. (b) Chloroplasts.
 (c) Cell wall. (d) Plasma membrane.
- 18 Which of the following are found in both of a human skin cell and a cell of a corn plant leaf?
 (a) Nucleus and cytoplasm. (b) Plasma membrane and large vacuole.
 (c) Nucleus and plastid. (d) Plasma membrane and cell wall.
- 19 Which of the following is from the chloroplasts functions in the plant cell?
 (a) Performing photosynthesis process.
 (b) Transport inside the cell.
 (c) The breakdown of glucose and energy production.
 (d) Water storage.

- 20** Which of the following most of it consists of water?
 (a) Cell wall. (b) Mitochondria. (c) Nucleus. (d) Cytoplasm.
- 21** Which of the following structures has a transport function inside the living cell?
 (a) Endoplasmic reticulum. (b) Mitochondria.
 (c) Chloroplast. (d) Sap vacuole.
- 22** Which of the following cells contains a large sap vacuole?
 (a) A cell in bean plant. (b) Bacterial cell. (c) Fungal cell. (d) Hepatic cell.
- 23** Which of the following organelles has a storage function inside the living cell?
 (a) Mitochondria. (b) Vacuole.
 (c) Chloroplast. (d) Endoplasmic reticulum.

24 The opposite figure shows a plant cell, study it, then answer:

(1) Which of the following represents the energy-production centers in the cell?

- (a) (1). (b) (2).
 (c) (3). (d) (4).

(2) Which of the following structures contains the genetic material?

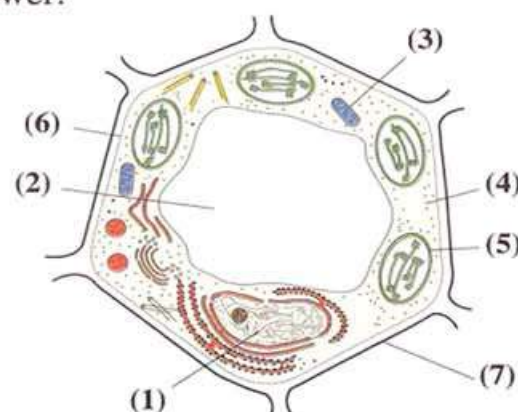
- (a) (1). (b) (2).
 (c) (1) & (6). (d) (2) & (4).

(3) Which of the following structures regulates the passage of substances from and to the cell?

- (a) (2). (b) (5). (c) (6). (d) (7).

(4) Which structure is considered a gel-like substance in the cell?

- (a) (1). (b) (4). (c) (5). (d) (7).



25 The figure in front of you illustrates an animal cell, study it, then answer:

(1) * Which of the following structures whose number decreases in the plant cell?

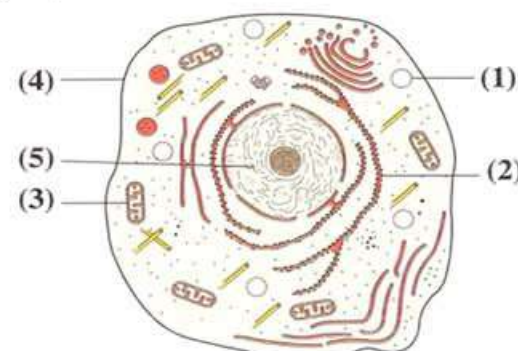
- (a) (1). (b) (2).
 (c) (4). (d) (5).

(2) Which of the following structures consists of a group of membranes?

- (a) (1). (b) (2).
 (c) (3). (d) (4).

(3) Which of the following structures controls the living cell activities?

- (a) (1). (b) (2). (c) (3). (d) (5).



- 26 Which of the following structures is usually located at the center of the animal cell?
 (a) Nucleus. (b) Vacuole. (c) Mitochondria. (d) Plastid.

Water in living cells

- 27 From the inorganic molecules is/are
 (a) carbohydrates (b) water (c) proteins (d) lipids
- 28 In mammals, the percentage of water is about % of the organism's body mass.
 (a) 23 (b) 47 (c) 70 (d) 90
- 29 The percentage of water in blood plasma and other body fluids in mammals is about % of the body mass.
 (a) 23 (b) 47 (c) 70 (d) 83
- 30 The percentage of water inside the mammal cells is about % of the organism's body mass.
 (a) 23 (b) 47 (c) 60 (d) 80
- 31 Which of the following directly participate(s) in all the metabolic processes?
 (a) Mineral salts. (b) Water.
 (c) Lipids. (d) Carbohydrates.

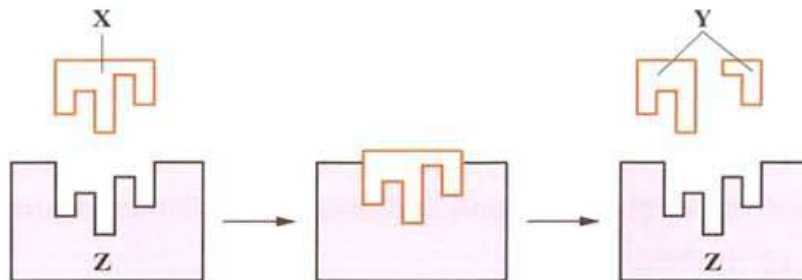
Metabolism

- 32 Which of the following statements expresses a characteristic feature of the catabolic process ?
 (a) It aims to store energy inside the cell till using it.
 (b) It takes place in plant cells, but it doesn't take place in animal cells.
 (c) The energy required for performing the vital functions of the cell is obtained through it.
 (d) It takes place in animal cells, but it doesn't take place in plant cells.
- 33 Which of the following is applied to anabolic and catabolic processes respectively?
 (a) Oxidation process / Reduction process.
 (b) Consuming energy / Producing energy.
 (c) Producing energy / Consuming energy.
 (d) Breaking down of chemical bonds / Formation of chemical bonds.
- 34 Glucose sugar is broken down inside the cell through a process called
 (a) excretion (b) digestion
 (c) cellular respiration (d) photosynthesis

35 Which of the following are from the products of the glucose breakdown?

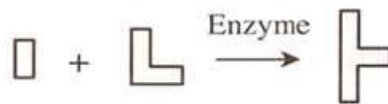
- (a) O_2 & Energy. (b) O_2 & Water.
(c) CO_2 & O_2 (d) Water & CO_2

36 The following figures represent a model for the action mechanism of an enzyme inside the human body, which of the following represents letters (X), (Y) and (Z) respectively?



- (a) Enzyme / Products / Substrate. (b) Enzyme / Substrate / Products.
(c) Substrate / Enzyme / Products. (d) Substrate / Products / Enzyme.

37 The following figures represent a chemical reaction:



Which of the following figures represents the enzyme in this reaction?



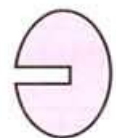
(a)



(b)

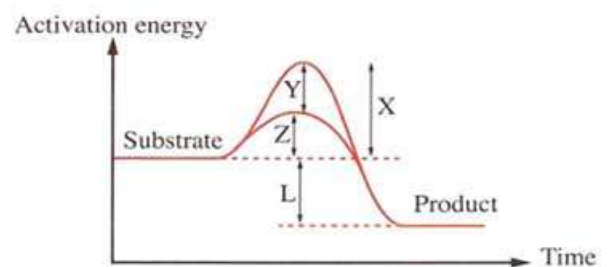


(c)



(d)

38 * From the opposite graph that shows the effect of the enzyme on the activation energy of a chemical reaction. Which of the following represents the arrow that illustrates the reduction in the activation energy, due to the addition of an enzyme?



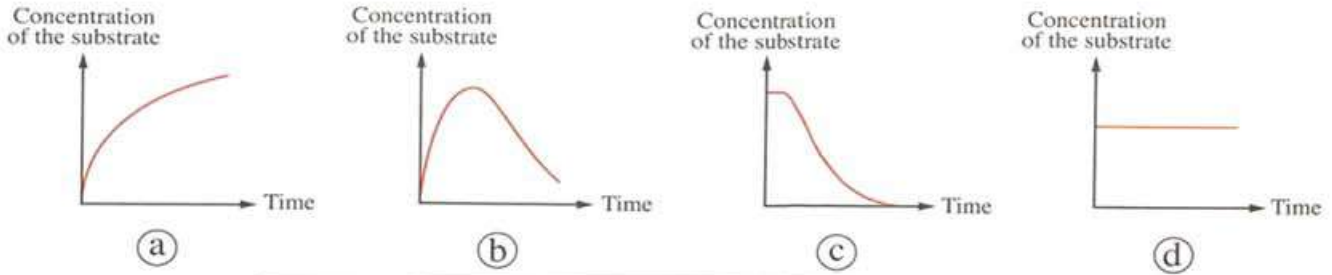
- (a) X (b) Y (c) Z (d) L

39 The opposite figure represents one of the enzyme's properties, what is this?

- (a) Participating in the reactions without being consumed.
(b) Increasing the reaction speed.
(c) Specializing in the combination with a certain substance.
(d) Decreasing the activation energy.



- 40 * Which of the following graphs shows the concentration of the substrate on adding the enzyme to it?



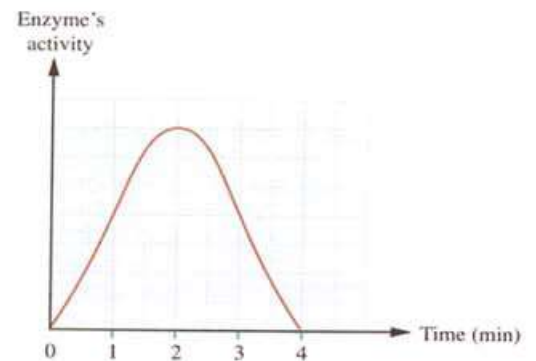
- 41 Which of the following factors leads to slowing down the action of the enzyme directly?

- (a) Changing the pH value to its optimum for its action.
- (b) Increasing the temperature greater than that is optimum for its action.
- (c) Increasing the molecules of substrate.
- (d) Increasing the enzyme's molecules.

- 42 The opposite graph represents the change in the enzyme's activity throughout a certain period of time, study it, then determine:

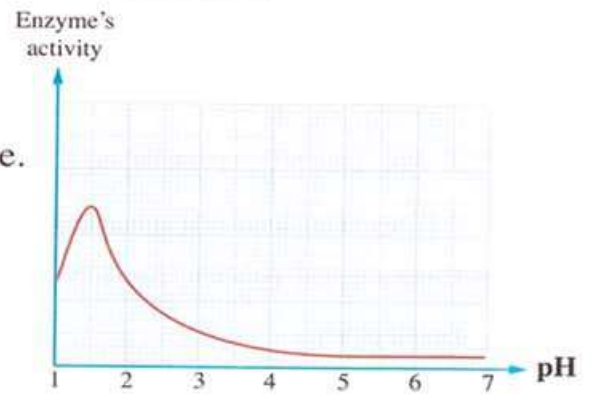
Which of the following statements is **not** correct?

- (a) The enzyme amount doesn't change during the period from (0) : (4).
- (b) The reaction products increase at minute (4).
- (c) The enzyme's activity increases at the period from (2) : (4).
- (d) The highest concentration of reactants is at time (0).

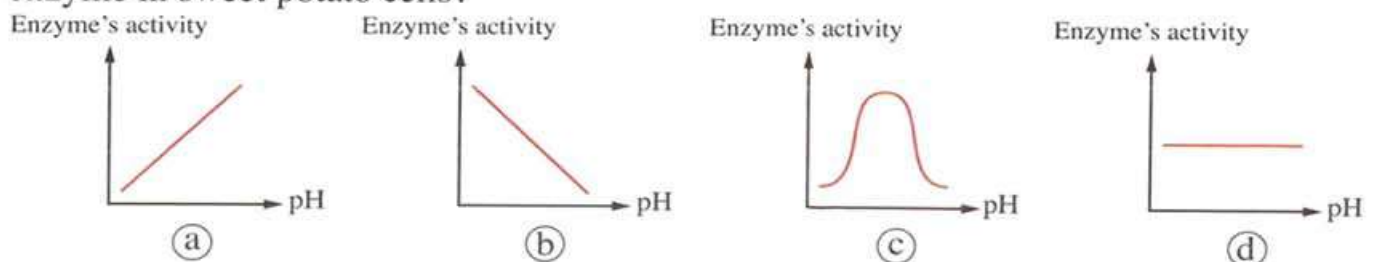


- 43 The opposite graph shows the relation between the pH value and the activity of an enzyme, which of the following statements could be concluded?

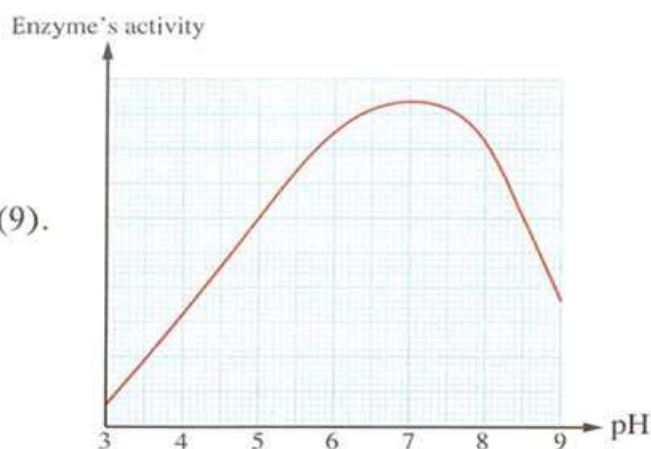
- (a) This enzyme is not affected by the medium's type.
- (b) This enzyme works with a maximum efficiency in the acidic medium.
- (c) This enzyme works with a maximum efficiency in the neutral medium.
- (d) This enzyme works with a maximum efficiency in the alkaline medium.



- 44 Which of the following graphs represents the effect of pH on the action of catalase enzyme in sweet potato cells?



- 45 From the opposite graph that illustrates the effect of pH on the activity rate of an enzyme, which of the following can be concluded?
- (a) The enzyme is consumed when pH reaches (9).
 - (b) The enzyme works with the highest efficiency at pH = 6
 - (c) The rate of the enzyme's activity decreases to half, when pH changes from (5) : (7).
 - (d) The rate of the enzyme's activity is equal at pH values (5) and (8.5).



- 46 Which of the following is considered the reason for the constancy of the reaction rate after a while from the beginning of the reaction in the presence of the enzyme?
- (a) The increase of the enzyme concentration.
 - (b) The saturation of the enzyme active sites with substrate.
 - (c) The increase of the substrate concentration.
 - (d) The increase in the active sites number of the enzyme.

Second Miscellaneous Questions

1 Write the scientific term for each of the following statements:

- (a) The most abundant chemical substance in living organisms and all vital processes depend on it.
- (b) * The structural and functional unit of all living organisms.
* The smallest independent constituent in the structure of the multicellular organism.
- (c) Unicellular organisms whose genetic material isn't surrounded by a nuclear membrane.
- (d) Living organisms whose genetic material is surrounded by a nuclear membrane and contain specialized organelles.
- (e) A thin semi-permeable membrane separates between the living cell components and its surrounding environment.
- (f) A gel-like substance consists mostly of water and contains some chemical substances.
- (g) Specific catalysts or activators increase the speed of the chemical reactions in the cell.
- (h) A set of continuous biochemical reactions that occur inside the living organism's cells.
- (i) The minimum amount of energy required to start the chemical reaction.

2 Give reasons for:

- (a) Bacteria belong to prokaryotes.
- (b) Protozoa belong to eukaryotes.
- (c) The cell wall of bacteria is characterized by containing peptidoglycan substance.
- (d) * Nucleus determines the traits of the living organism.
* Nucleus controls the living cell activities.
- (e) Cytoplasm has an important role in the survival of the living cell.
- (f) Chloroplasts have an important role in performing the photosynthesis process.
- (g) Water acts as a universal solvent in the living cell.
- (h) The stability of the internal temperature of living organisms, despite the external fluctuations.
- (i) * Water has a role in keeping the internal balance of the body.
* Water has a role in supporting the complex chemical activities in the cell.
- (j) Enzymes are similar with chemical catalysts.
- (k) Enzymes are specific proteins.

3 What happens in each of the following cases:

- (a) The absence of chloroplasts in the cells of bean plant.
- (b) The absence of plasma membrane in the living cell.
- (c) The decrease of water specific heat inside cells.
- (d) The absence of enzymes in living cells.
- (e) The increase of temperature above the optimal temperature for the enzyme's action.
- (f) The increase of pH value higher than the optimal pH for the enzyme's action.

4 Compare between each of the following:

- (a) Bacteria and fungi, "**in terms of:** the structure of the cell wall".
- (b) Prokaryotes and eukaryotes, "**in terms of:** the number of cells from which the living organism is formed – site of genetic material".
- (c) Kingdom Fungi and kingdom Plantae, "**in terms of:** the number of cells from which the living organism is formed – the structure of the cell wall – mode of nutrition".
- (d) Cell wall and plasma membrane, "**in terms of:** description – function – location".
- (e) Vacuoles in the plant cell and vacuoles in the animal cell.
- (f) Catabolism and anabolism.

5 The structure of cell wall in different kingdoms of eukaryotes is different. **Explain this by giving examples.**

6 "Cytoplasm contains cell organelles only". **How far is this statement correct? With explanation.**

7 "The sites of water inside and outside the mammal cells are different". **Explain this statement.**

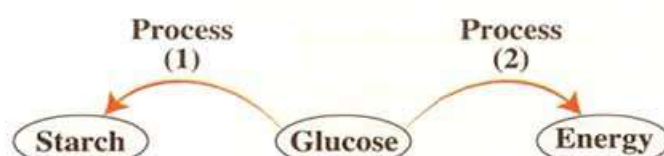
- 8 What is the importance of water in the living organism's cells?
- 9 "Metabolic processes occur in plant cells only". **How far is this statement correct?**
With explanation.

Questions that measure **high levels of thinking**

Answered in detail

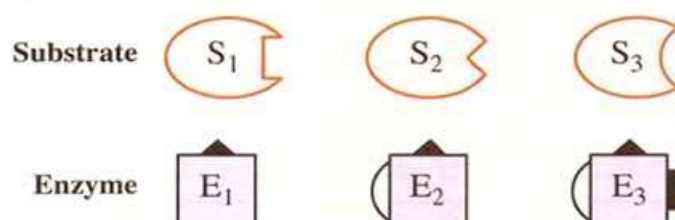
Choose the correct answer:

- 1 Which of the following do you expect its/their presence is abundant in the birds' muscular cells?
- (a) Endoplasmic reticulum. (b) Mitochondria.
(c) Plasma membrane. (d) Vacuoles.
- 2 The following diagram expresses two processes (1) and (2) that occur in a plant cell:



What do these processes represent?

- (a) (2) is catabolism and (1) is anabolism. (b) (1) is catabolism and (2) is anabolism.
(c) Both (1) and (2) are catabolism. (d) Both (1) and (2) are anabolism.
- 3 Study the following figures, then answer:



Which of the following statements is correct about the enzymes that are present in the figure?

- (a) E₁ is less specific than E₃ (b) E₁ is more specific than E₃
(c) E₂ is less specific than E₃ (d) All these enzymes are highly specific.
- 4 If an enzyme is extracted from a type of bacteria that live in hot acidic springs whose temperature reaches up to 90°C, which of the following reasons leads to the stopping of the enzyme action?
- (a) Increasing the substrate concentration.
(b) Increasing the enzyme concentration.
(c) Increasing the medium pH
(d) Decreasing the surrounding temperature to 80°C

كيفية طباعة صفحات معينة من ملف معين مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9



حمل الآن

مجاناً وحصرياً

المراجعة رقم (2)

اختبار شهر اكتوبر





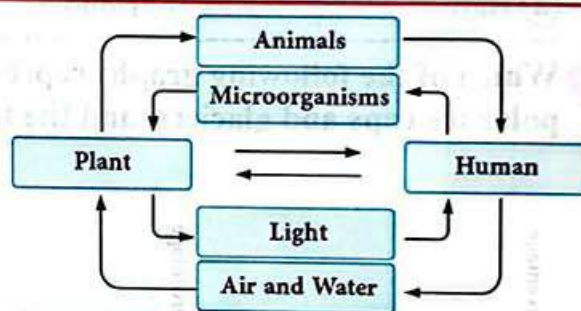
Questions marked with  are answered with explanations

First Multiple Choice Questions

- 1 Which of the following correctly expresses the environment?
- (I) Includes biotic and abiotic factors and the mutual relationships among them
 (II) A system composed of chemical, physical, and biological separated elements
 (III) Influenced by a set of variables surrounding humans and living organisms
- (a) (II), (I) only (b) (III), (I) only (c) (III), (II) only (d) (III), (II), (I)

- 2 Which of the following does the opposite figure correctly represent?

- (a) The environment as an integrated system
 (b) The biotic factors of the environment
 (c) The abiotic factors of the environment
 (d) The separation of the components of the environment



- 3 The following figures represent examples of



- (a) Similar types of ecosystems (b) Different types of ecosystems
 (c) Similar types of spheres of one ecosystem (d) Different types of spheres of one ecosystem

- 4 The natural environment consists of four spheres

- (a) Interconnected, influenced by human activities but do not affect them
 (b) Interconnected and in a state of continuous change
 (c) Not interconnected and in a state of continuous change
 (d) Not interconnected, influenced by human activities, and affect them

- 5 The environment includes biotic factors such as humans, animals, and plants, and abiotic factors such as air and water.

The above paragraph contains the types of Earth's spheres except

- (a) The hydrosphere (b) The biosphere (c) The atmosphere (d) The lithosphere

Which of the following figures represents the correct distribution of land and water on Earth's surface?



(a)



(b)



(c)

Land
Water



(d)

Water covers of Earth's surface, and water represents 97% of this water.

(a) 30% – fresh

(b) 50% – salt

(c) 70% – salt

(d) 70% – fresh

The proportion of fresh water found in rivers, freshwater lakes, and groundwater is the proportion found in ice in polar regions, mountain peaks, and glaciers.

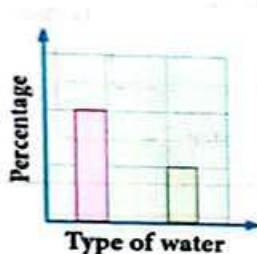
(a) Half

(b) Double

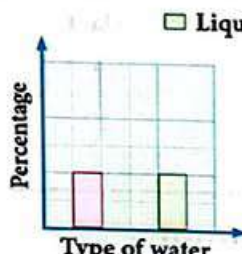
(c) One-fourth

(d) Three times

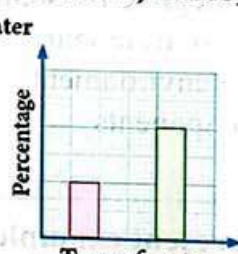
Which of the following graphs represents the ratio between the amount of water found in polar ice caps and glaciers, and the freshwater in rivers, lakes, and groundwater?



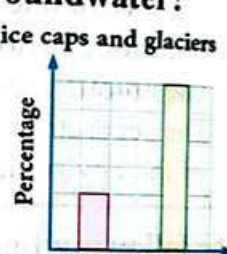
(a)



(b)



(c)



(d)

The Earth is distinguished from the other planets by the presence of

(a) The lithosphere

(b) The hydrosphere

(c) The atmosphere

(d) Heavy metals

Water exists in nature in the three states of matter. Which of the following represents the states of water present in the following spheres?

	Atmosphere	Hydrosphere
(a)	Vapor only	Liquid and solid
(b)	Vapor and liquid	Vapor, liquid, and solid
(c)	Vapor only	Vapor, liquid, and solid
(d)	Vapor and liquid	Liquid and solid

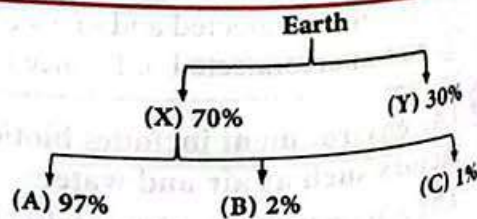
Study the opposite schematic figure that represents the distribution of Earth's landforms, then determine: Which of the following statements is correct?

(a) (X): Hydrosphere, (C): Frozen water

(b) (X): Hydrosphere, (B): Frozen water

(c) (A): Salt water, (Y): Liquid fresh water

(d) (B): Liquid fresh water, (Y): Atmosphere

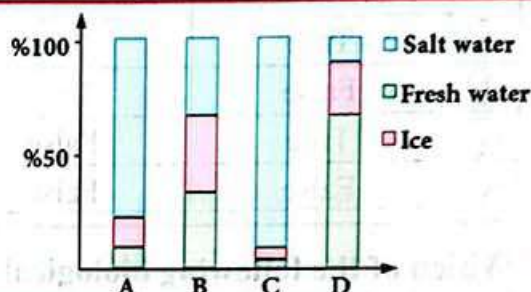


13 Which of the following represents the hydrosphere on Earth?

- (a) Represents more than $\frac{3}{4}$ of the Earth's surface
- (b) Represents more than $\frac{2}{3}$ of the Earth's surface
- (c) Represents more than three times the land area on Earth's surface
- (d) Represents less than twice the land area on Earth's surface

14 Study the opposite graph, then determine:
Which of the columns shown in the figure represents the correct distribution of water on Earth's surface?

- (a) A
- (b) B
- (c) C
- (d) D



15 The water directly suitable for human consumption represents of the hydrosphere on Earth's surface.

- (a) 97%
- (b) 2%
- (c) 1%
- (d) 99%

16 Which of the following processes in the water cycle (hydrological cycle) is represented by transpiration in plants?

- (a) Surface runoff
- (b) Water infiltration
- (c) Evaporation
- (d) Condensation

17 Water can move from the hydrosphere to the atmosphere through the process of

- (a) Evaporation
- (b) Condensation
- (c) Precipitation
- (d) Freezing

18 All of the following increase the percentage of water in the atmosphere except

- (a) Transpiration in plants
- (b) Respiration in humans
- (c) Evaporation of water from surfaces
- (d) Infiltration of water into rock pores

19 Which of the following statements best describes the role of plants in the hydrological cycle (water cycle)?

- (a) Plants prevent the loss of water from the Earth's surface and reduce the return of water to the atmosphere
- (b) Plants contribute to transpiration, which increases the water vapor content in the air
- (c) Plants reduce the amount of water infiltrating underground because they consume it entirely
- (d) Plants obstruct the movement of water vapor and prevent cloud formation

20 From your study of the opposite figure that shows the water cycle in nature, examine it carefully, then answer the following:

What does process (X) represent?

- (a) Transpiration
- (b) Evaporation
- (c) Precipitation
- (d) Condensation



- 21 Study the following two statements:

Statement (1): The hydrological cycle is a system capable of changing the Earth's surface physically, chemically, and biologically.

Statement (2): The water cycle involves the three physical states of water (solid – liquid – vapor).

Which of the following is correct?

	Statement (1)	Statement (2)
(a)	True	True
(b)	False	True
(c)	True	False
(d)	False	False

- 22 Which of the following biological processes distinguishes plants from humans in the hydrological cycle?

(a) Transpiration (b) Respiration (c) Excretion (d) Digestion

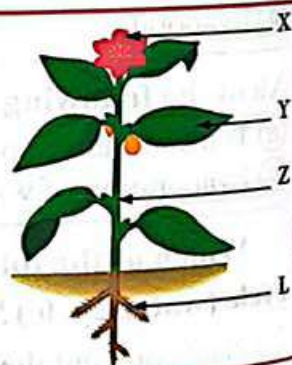
- 23 The transformation of water from the liquid state to the gaseous state during the water cycle occurs through

(a) Abiotic natural phenomena only
 (b) Biological processes from plants only
 (c) Abiotic natural phenomena and biological processes from plants
 (d) Abiotic natural phenomena and biological processes from plants and animals

- 24 Study the opposite figure, then answer:

Which parts of the opposite plant mainly contain stomata?

(a) Y only
 (b) Y, Z
 (c) Z, X
 (d) Y, L



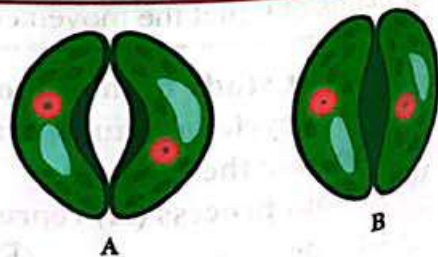
- 25 What type of rocks does water infiltrate through after rainfall to form groundwater?

(a) Igneous rocks (b) Sedimentary rocks (c) Metamorphic rocks (d) Volcanic rocks

- 26 Study the opposite figure showing two states of microscopic stomata in plants, then determine:

Which of the two states causes the ascent (upward movement) of water and salts from the root to the upper parts of the plant?

(a) State (A) only (b) State (B) only
 (c) Both states (A) and (B) (d) Neither of them



27 Which of the following represents the correct sequence of transpiration water movement in plants?

- (a) Stomata → Roots → Xylem tissue
(b) Roots → Xylem tissue → Stomata
(c) Xylem tissue → Roots → Stomata
(d) Roots → Stomata → Xylem tissue

28 Transpiration in plants functions to

- (I) Lower the temperature of the plant body
(II) Create a force opposing gravity to pull water and salts upward through the phloem tissue
(III) Eliminate excess water in the form of water vapor

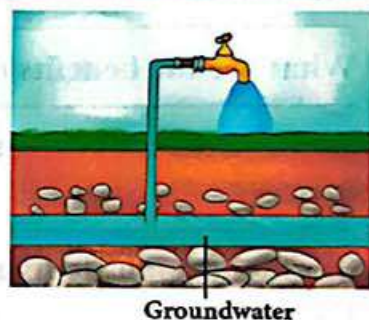
- (a) (II), (I) only
(b) (III), (I) only
(c) (III), (II) only
(d) (III), (II), (I)

29 Which of the following biological processes does the organism use to eliminate nitrogenous wastes resulting from metabolism

- (a) Transpiration in plants and animals
(b) Transpiration in plants only
(c) Excretion in plants and animals
(d) Excretion in animals only

30 Which of the following represents a correct pathway for the formation of water shown in the opposite figure within the hydrological cycle?

- (a) Mediterranean Sea – Clouds – Water vapor – Rain – Sedimentary rocks
(b) Mediterranean Sea – Water vapor – Clouds – Rain – Sedimentary rocks
(c) Mediterranean Sea – Water vapor – Clouds – Rain – Igneous rocks
(d) Water vapor – Mediterranean Sea – Clouds – Rain – Metamorphic rocks



Second Essay Questions

31 Write the scientific term that refers to the following statements:

- (1) A community of living organisms that interact with each other and with the nonliving components in order to adapt to changing conditions.
- (2) One of Earth's spheres that covers 70% of the planet's surface.
- (3) Continuous change among the three states of water on Earth's surface within a closed system.
- (4) A process by which the plant eliminates water through the stomata.
- (5) A type of water formed as a result of water infiltration through sedimentary rocks.

32 Give reasons for the following:

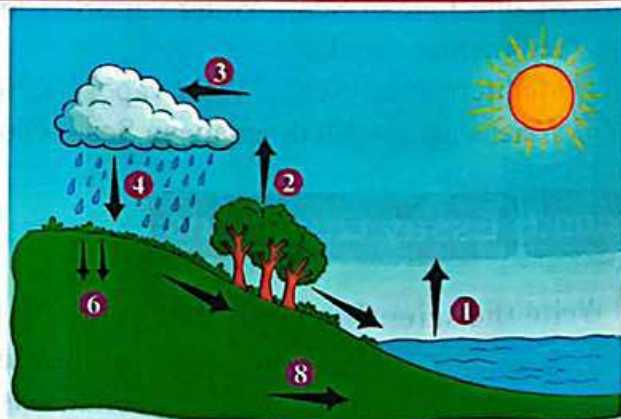
- (1) The water cycle in nature is a system capable of changing the Earth's surface physically, chemically, and biologically.
- (2) The water cycle in nature is considered a closed system.
- (3) Groundwater is formed in the hydrological cycle.
- (4) Transpiration is very important for the plant.
- (5) Excretion is very important for living organisms.

33 Correct the mistake in the following statements:

- (1) The natural environment consists of three interconnected spheres.
- (2) The lithosphere distinguishes Earth from the other planets.
- (3) The water cycle in nature is considered an isolated system in which water constantly moves from one place to another through several pathways.
- (4) The process of precipitation contributes to the formation of clouds in the hydrological cycle.
- (5) Water and salts ascend (move up) from the roots of plants to the stem and leaves through the phloem tissue.

34 The sun and Earth's gravity are the main driving forces in the hydrological cycle. Explain this statement.
35 What spheres make up the natural environment?
36 What is the difference between precipitation and infiltration in the hydrological cycle?
37 Plants release water vapor through three biological processes. State these processes.
38 What are the benefits of transpiration for plants?
39 In the process of excretion, living organisms eliminate different types of wastes. Explain this.
40 Study the opposite figure carefully, then answer:

- (a) What does the opposite figure represent?
- (b) Which arrows represent the process of condensation?
- (c) Which arrows represent biological processes?
- (d) Which arrows represent the process of precipitation?


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Questions marked with are answered with explanations

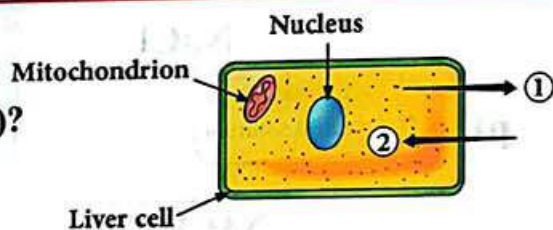
First Multiple Choice Questions

The unique properties of water

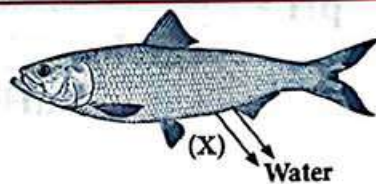
- 1 Study the following statements, then choose: which of them expresses the unique properties of water?
- (I) Water has the ability to dissolve many chemical substances.
 (II) Water always exists in liquid form at the known temperatures on the Earth's surface.
 (III) Water passes through the plasma membrane of all cell of living organisms.
- (a) (I), (II) only (b) (I), (III) only (c) (II), (III) only (d) (I), (II), (III)

- 2 The opposite diagram represents the structure of a living cell. Study it well, then answer, What is the main purpose of the passage of water in direction (2)?

- (a) Transport of nutrients and oxygen
 (b) Removal of wastes
 (c) Regulation of temperature
 (d) Transport of carbon dioxide gas



- 3 What is the main purpose of water coming out in direction (X) in the diagram?
- (a) Energy production (b) Elimination of nitrogenous wastes
 (c) Release of oxygen gas (d) Increasing temperature



The chemical composition of water

- 4 (1) In the opposite water molecule, the mass percentage of hydrogen is (Given that the atomic mass of H = 1, O = 16)

- (a) $\frac{100}{3}\%$ (b) $\frac{200}{3}\%$ (c) $\frac{100}{9}\%$ (d) $\frac{800}{9}\%$



- (2) In the opposite water molecule, the mass percentage of oxygen is (Given that the atomic mass of H = 1, O = 16)

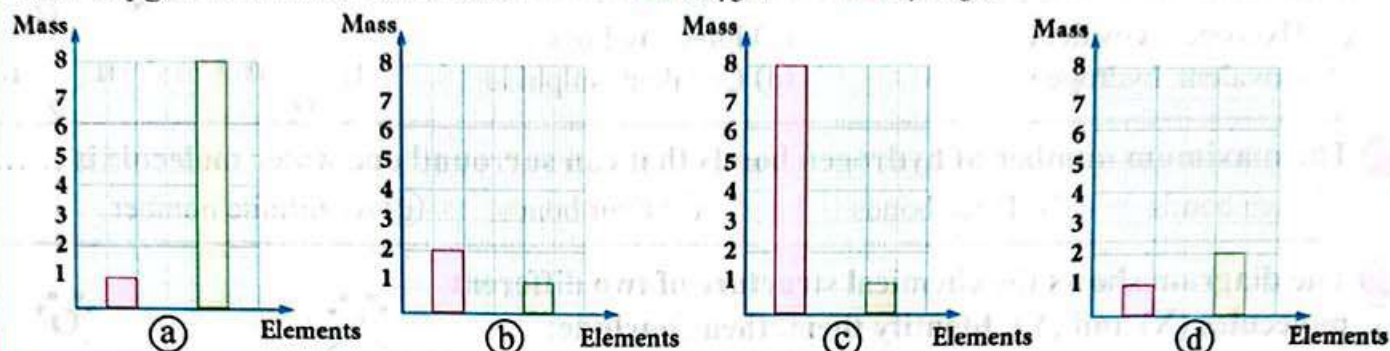
- (a) $\frac{100}{3}\%$ (b) $\frac{200}{3}\%$ (c) $\frac{100}{9}\%$ (d) $\frac{800}{9}\%$

- 5 How many covalent bonds are present inside three water molecules?

- (a) 3 bonds (b) 6 bonds
 (c) 9 bonds (d) 12 bonds

- 6 Which of the following graphs represents the relationship between the mass of hydrogen and oxygen in a water molecule?

■ Oxygen ■ Hydrogen



- 7 A pure sample of water contains 0.37 g of hydrogen. The total mass of the sample equals.....
- (a) 3.33 g (b) 2.96 g (c) 8.89 g (d) 1.1 g
- 8 A sample of water contains oxygen with a mass percentage of 90%. This sample is
- (a) Pure, with hydrogen mass percentage of 10%. (b) Impure, containing exogenous impurities
(c) Impure, containing non-exogenous impurities (d) Pure, with hydrogen mass percentage of 11.11%

- 9 Which of the following structural diagrams correctly represents the water molecule and the bond angle between its two covalent bonds?



- 10 Which of the following expresses correctly the structure of the water molecule?



- 11 A covalent bond is a type of bonds in which two atoms share a(an) number of electrons. Which of the following is correct?

- (a) (1) Chemical, (2) equal (b) (1) Chemical, (2) unequal
(c) (1) Physical, (2) equal (d) (1) Physical, (2) unequal

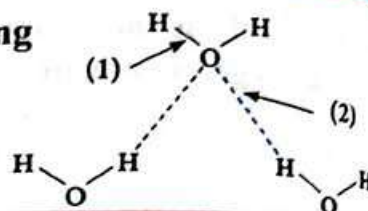
The polarity of water

- 12 Which of the following correctly describes the components of a water molecule?

	Number of atoms	Number of covalent bonds	Number of hydrogen bonds
(a)	3	2	0
(b)	3	1	4
(c)	2	2	0
(d)	2	1	4

- 13 From your study of the opposite diagram: Which of the following represents the two types of bonds (1) and (2), respectively?

(a) Hydrogen, covalent (b) Ionic, hydrogen
(c) Covalent, hydrogen (d) Covalent, sulphide



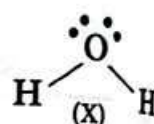
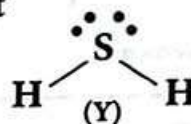
- 14 The maximum number of hydrogen bonds that can surround one water molecule is

(a) Two bonds (b) Three bonds (c) Four bonds (d) An infinite number

- 15 The diagram shows the chemical structure of two different molecules (X) and (Y). Identify them, then conclude:

Which of the two compounds has a higher boiling point?

(a) Compound (Y), due to hydrogen bonds between its molecules
(b) Compound (X), due to covalent bonds
(c) Compound (X), due to hydrogen bonds between its molecules
(d) Compound (Y), due to covalent bonds



- 16 Which of the following explains the ability of water to dissolve most salts and break them into hydrated ions?

(a) Presence of ionic bonds (b) Presence of covalent bonds (c) Water polarity (d) Small bond angles

- 17 In polar molecules such as water, the more electronegative atom

(a) Has a lower ability to attract electrons (b) Carries one or more partial positive charges
(c) Repels particles with positive charges (d) Carries one or more partial negative charges

- 18 A pure water sample contains bonds.

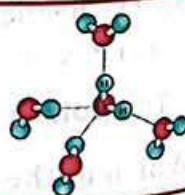
(a) Polar covalent bonds causing low boiling point. (b) Polar covalent bonds with bond angles $> 90^\circ$
(c) Hydrogen bonds causing low boiling point (d) Hydrogen bonds reducing cohesion

- 19 Which of the following explains why water has a higher boiling point compared to hydrogen sulphide (H_2S), despite the similarity in their molecular structures?

(a) Oxygen is more electronegative than Sulphur
(b) Covalent bonds in water are weaker than that in H_2S
(c) Water Hydrogen bonds are stronger than that in H_2S
(d) Water is non-polar while H_2S is polar

- 20 The diagram shows the structure of a water molecule. The angles between bonds in water molecule equals

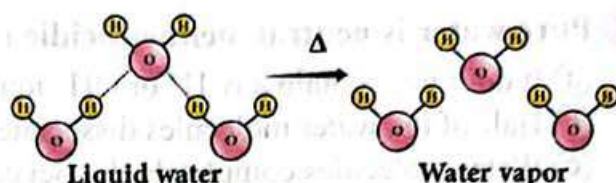
(a) 104.5° (b) 105.4°
(c) 120° (d) 100°



- 21 All the following are consequences of water polarity, except

(a) Water molecules associate together through hydrogen bonds
(b) Ability to dissolve many mineral salts
(c) Boiling point of water rises to 100°C
(d) Ability to dissolve a non-polar organic compound

- 22** The opposite diagram shows the process of converting a sample of liquid water into water vapor. What do you conclude from comparing the covalent bond with the hydrogen bond?



- (a) The covalent bond is stronger than the hydrogen bond; therefore, it is not broken during boiling.
(b) The covalent bond is weaker than the hydrogen bond; therefore, it is broken during boiling.
(c) The covalent bond is weaker than the hydrogen bond; therefore, it is not broken during boiling.
(d) The covalent bond is stronger than the hydrogen bond; therefore, it is broken during boiling.

- 23** Which of the following statements explains the ability of water to dissolve ionic salts such as sodium chloride (NaCl)?

- (a) Water is a nonpolar molecule; therefore, it dissolves ionic salts easily.
(b) Polar water molecules surround the ions and separate them from the crystal due to attraction of opposite charges.
(c) Water contains strong covalent bonds that break the ionic bonds in salt.
(d) Water is a polar molecule but cannot form bonds with ions.

- 24** Which of the following occurs in the dissolution of sodium chloride in water?

- (a) The crystal lattice breaks into sodium atoms and chlorine atoms.
(b) Sodium ions are attracted to the positive pole of water.
(c) Chloride ions are attracted to the negative pole of water.
(d) Water molecules prevent sodium and chloride ions from recombining.

- 25** Read both statements carefully, then choose:

- (1): Sodium ions are surrounded by water molecules, water is attracted from the oxygen side.
(2): Chloride ions are surrounded by water molecules, water is attracted from the oxygen side.
During the dissolution of table salt in water, both sodium and chloride ions are surrounded by water molecules, and the result is

	Statement (1)	Statement (2)
(a)	True	True
(b)	False	True
(c)	True	False
(d)	False	False

- 26** Dissolution of sodium chloride in water is not considered hydrolysis because

- (a) Chloride ions combine with water to form hydrochloric acid.
(b) Sodium ions combine with water to form sodium hydroxide.
(c) Neither sodium nor chloride ions combine with water.
(d) Both sodium and chloride ions combine with water.

The ionic equilibrium of water and hydrolysis of salts

- 27** The equation representing the ionization of pure water is

- (a) $\text{H}_2\text{O}_{(l)} \rightarrow \text{H}_2(\text{g}) + \text{O}_2(\text{g})$
(b) $\text{H}_2\text{O}_{(l)} \rightleftharpoons \text{H}^+_{(\text{aq})} + \text{OH}^-_{(\text{aq})}$
(c) $\text{H}_2\text{O}_{(l)} \rightarrow \text{H}^+_{(\text{aq})} + \text{OH}^-_{(\text{aq})}$
(d) $\text{H}_2\text{O}_{(l)} \rightleftharpoons \text{H}_3\text{O}^+_{(\text{aq})} + \text{O}^{2-}_{(\text{aq})}$

28 Pure water is neutral, neither acidic nor basic, because

- (a) It does not contain any H^+ or OH^- ions.
- (b) Half of the water molecules dissociate into H^+ and OH^- ions.
- (c) Water molecules completely dissociate into H^+ and OH^- ions.
- (d) The concentration of H^+ ions equals the concentration of OH^- ions.

29 All the following express hydrolysis, except

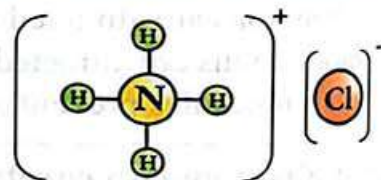
- (a) A salt dissolves in water producing a weak acid and a strong base.
- (b) A salt dissolves in water producing a strong acid and a weak base.
- (c) A salt dissolves in water producing a weak acid and a weak base.
- (d) A salt dissolves in water producing a strong acid and a strong base.

30 When salt (X) is dissolved in pure water, the concentration of hydrogen ions equals the concentration of hydroxide ions. Therefore, we conclude that

- (a) Salt solution X is neutral like ammonium chloride.
- (b) Salt solution X is acidic like ammonium chloride.
- (c) Salt solution X is neutral like sodium chloride.
- (d) Salt solution X is acidic like sodium chloride.

31 What is the type of solution resulting from dissolving the compound shown in the diagram in water?

- (a) Neutral
- (b) Acidic
- (c) Basic
- (d) Amphoteric



32 Which of the following salt solutions of equal concentration has the highest hydroxide ion concentration?

- (a) Table salt (NaCl)
- (b) Ammonium bicarbonate (NH_4HCO_3)
- (c) Ammonium chloride (NH_4Cl)
- (d) Sodium bicarbonate ($NaHCO_3$)

33 The hydrolysis of salt XY is represented by equation: $XY_{(s)} + H_2O_{(l)} \rightarrow XOH_{(aq)} + H^+_{(aq)} + Y^-_{(aq)}$

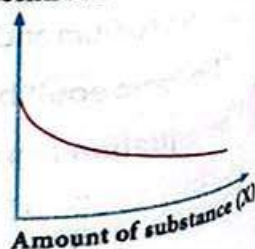
Based on this, which of the following represents the type of this solution?

- (a) Acidic; because the solution is rich in hydrogen ions
- (b) Basic; because the solution is rich in hydrogen ions
- (c) Neutral; because the solution is rich in hydroxide ions
- (d) Neutral; because the solution is rich in hydroxide ions

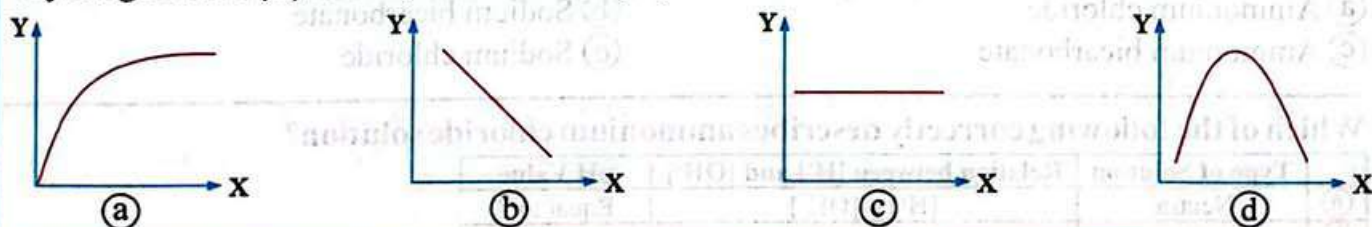
34 A substance (X) is added to pure water, leading to a change in the hydroxide ion concentration as shown in the diagram. Substance (X) may be

- (a) Sodium hydroxide (NaOH)
- (b) Sodium chloride (NaCl)
- (c) Ammonium chloride (NH_4Cl)
- (d) Sodium bicarbonate ($NaHCO_3$)

OH⁻ Concentration

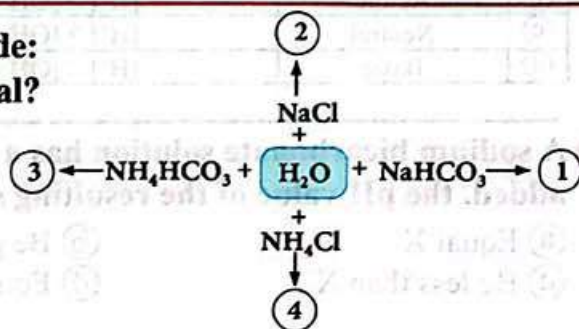


- 35** Which of the following dissolves in water without affecting the concentration of H^+ or OH^- ions?
- (a) Acetic acid (CH_3COOH) (b) Sodium chloride ($NaCl$)
(c) Ammonium chloride (NH_4Cl) (d) Sodium bicarbonate ($NaHCO_3$)
- 36** All the following occur when ammonium chloride dissolves in water, except
- (a) Concentration of positive hydrogen ions increases
(b) Concentration of negative hydroxide ions decreases
(c) Hydrochloric acid molecules form
(d) Ammonium hydroxide molecules form
- 37** Which of the following expresses the dissolution of ammonium bicarbonate in pure water?
- (a) Concentration of positive hydrogen ions increases
(b) Concentration of negative hydroxide ions increases
(c) The solution becomes neutral
(d) Hydrolysis does not occur
- 38** The solution resulting from the dissolution of table salt in water is neutral because
- (a) Salt ions remain in the solution without bonding to water ions
(b) All salt ions in the solution bond with water ions
(c) Sodium ions in the solution bond with water ions
(d) Chloride ions in the solution bond with water ions
- 39** Dissolution of a salt in water may lead to
- (a) Increase in both H^+ and OH^- concentrations unequally
(b) Decrease in both H^+ and OH^- concentrations unequally
(c) Some salt ions combine with water ions and the formation of an acidic solution
(d) Not all salt ions combine with water ions and the formation of a basic solution
- 40** Which of the following graphs expresses the relation between the concentration of hydrogen ions (X) and hydroxide ions (Y) in the same solution?



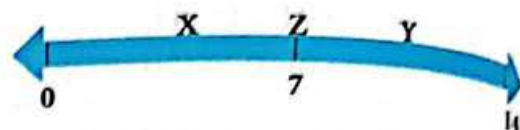
- 41** Study the opposite chart carefully, then conclude:
Which of the solutions shown in the chart is neutral?

- (a) (1), (3)
(b) (1), (2)
(c) (3), (4)
(d) (2), (3)



The pH (hydrogen exponent)

The opposite diagram shows the pH values of three different aqueous solutions. Study it carefully, then conclude: Which of the following represents the type of aqueous solutions (X), (Y), (Z)?



	(X)	(Y)	(Z)
(a)	Basic	Acidic	Neutral
(b)	Neutral	Basic	Acidic
(c)	Acidic	Neutral	Basic
(d)	Acidic	Basic	Neutral

The pH value of distilled (pure) water at 25 °C equals because

- (a) 4.5 - due to the presence of acidic impurities
- (b) 8.5 - due to the presence of basic impurities
- (c) 7 - because concentration of $[H^+]$ equals that of $[OH^-]$
- (d) 8 - because it is free of molecules

Which of the following statements correctly describes a sodium bicarbonate solution?

- (a) Its pH value equals 7
- (b) Its pH value is greater than 7
- (c) The concentration of hydrogen ions is greater than that of hydroxide ions
- (d) The concentration of hydrogen ions equals that of hydroxide ions

Which of the following salts, when dissolved in water, decreases the pH of water?

- (a) Ammonium chloride
- (b) Sodium bicarbonate
- (c) Sodium chloride
- (d) Ammonium bicarbonate

Which of the following salts, when dissolved in water, increases the pH?

- (a) Ammonium chloride
- (b) Sodium bicarbonate
- (c) Ammonium bicarbonate
- (d) Sodium chloride

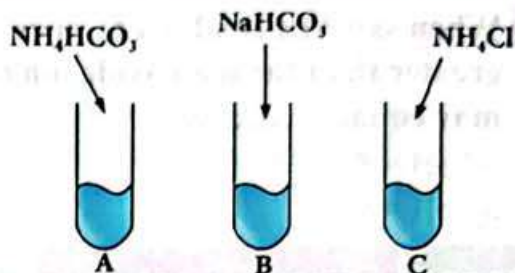
Which of the following correctly describes ammonium chloride solution?

	Type of Solution	Relation between $[H^+]$ and $[OH^-]$	pH Value
(a)	Neutral	$[H^+] = [OH^-]$	Equal to 7
(b)	Acidic	$[H^+] > [OH^-]$	Less than 7
(c)	Neutral	$[H^+] > [OH^-]$	Equal to 7
(d)	Basic	$[H^+] < [OH^-]$	Greater than 7

A sodium bicarbonate solution has a pH value of X. When sodium chloride crystals are added, the pH value of the resulting solution will

- (a) Equal X
- (b) Be greater than X
- (c) Be less than X
- (d) Equal 7

- 49 Three test tubes contain water samples. After adding salts as shown in the figure, changes occur in the pH value. Which of the following is correct?



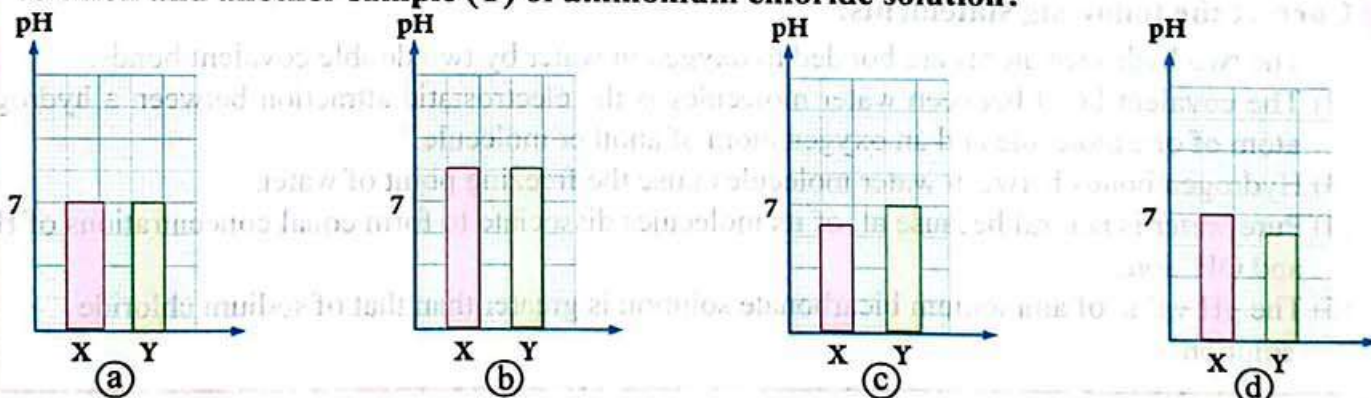
- 50 Two substances X and Y were each dissolved separately in pure water. The pH increased in the case of substance X, while the hydrogen ion concentration decreased in the case of substance Y. We conclude that

- (a) X and Y are both acidic substances (b) X and Y are both basic substances
(c) X is acidic; Y is basic (d) X is basic; Y is acidic

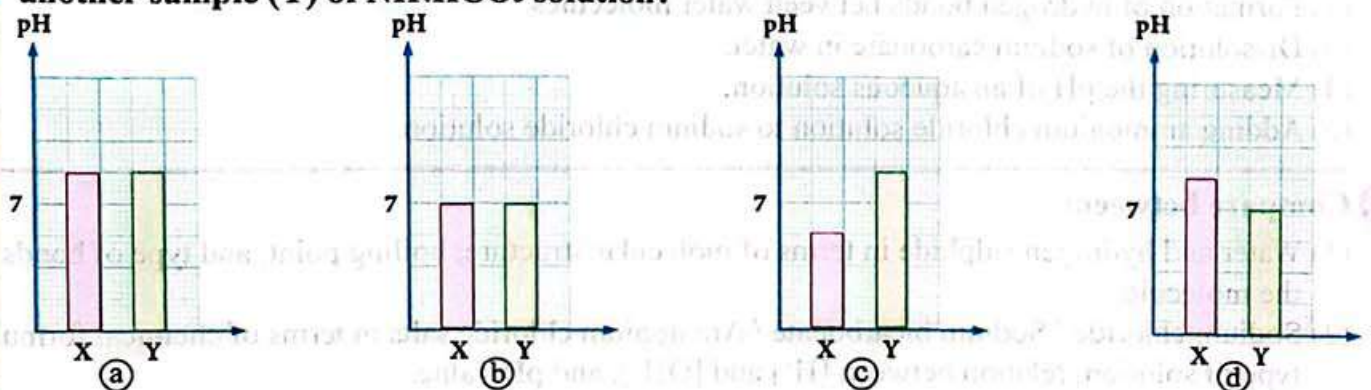
- 51 Which of the following correctly compares ammonium chloride and sodium bicarbonate solutions of equal concentration?

	Comparison Aspect	Ammonium chloride solution	Sodium bicarbonate solution
(a)	H ⁺ ion concentration	Lower	Higher
(b)	pH value	Lower	Higher
(c)	Type of solution	Acidic	Neutral
(d)	Type of solution	Neutral	Basic

- 52 Which of the following graphs represents the pH of a sample (X) of sodium chloride solution and another sample (Y) of ammonium chloride solution?



- 53 Which of the following graphs represents the pH of a sample (X) of NaHCO₃ solution and another sample (Y) of NH₄HCO₃ solution?



54 When salt MB is added to pure water, the hydrogen ion concentration becomes greater than the hydroxide ion concentration. The pH value of the resulting solution may equal

(a) pH = 5

(c) pH = 9

(b) pH = 7

(d) pH = 0

Second Essay Questions

55 Write the scientific term

- (1) A type of chemical bond between two atoms formed by each atom sharing one or more electrons.
- (2) A measure of an atom's ability to attract bonding electrons toward itself.
- (3) A bond that links water molecules together and links them with other polar covalent molecules.
- (4) A solution in which the hydrogen ion concentration is less than the hydroxide ion concentration.
- (5) A scale ranging between 0 and 14.

56 Give reasons for the following:

- (1) Both bonds in the water molecule are covalent.
- (2) Water is a polar compound.
- (3) The pH value of pure water equals 7.
- (4) Sodium chloride solution has a neutral effect on chemical indicators.
- (5) The pH value of water may differ from 7.

57 Correct the following statements:

- (1) The two hydrogen atoms are bonded to oxygen in water by two double covalent bonds.
- (2) The covalent bond between water molecules is the electrostatic attraction between a hydrogen atom of one molecule and an oxygen atom of another molecule.
- (3) Hydrogen bonds between water molecules raise the freezing point of water.
- (4) Pure water is neutral because all of its molecules dissociate to form equal concentrations of H^+ and OH^- ions.
- (5) The pH value of ammonium bicarbonate solution is greater than that of sodium chloride solution.

58 What happens when:

- (1) Oxygen is more electronegative than hydrogen in the water molecule.
- (2) Formation of hydrogen bonds between water molecules.
- (3) Dissolution of sodium carbonate in water.
- (4) Measuring the pH of an aqueous solution.
- (5) Adding ammonium chloride solution to sodium chloride solution.

59 Compare between:

- (1) Water and hydrogen sulphide in terms of molecular structure, boiling point, and type of bonds in the molecule.
- (2) Sodium chloride / Sodium bicarbonate / Ammonium chloride salts in terms of chemical formula, type of solution, relation between $[H^+]$ and $[OH^-]$, and pH value.

60 A pure water sample has a mass of 0.9 g. Calculate the mass of hydrogen and oxygen in this sample. (Given that atomic masses: H = 1, O = 16)

61 Water is a polar solvent that can dissolve most salts and polar compounds. Explain why water is polar.

62 Based on your study: Which tools can be used to measure pH? Which is the most accurate?

63 The following table shows the pH of different salt solutions:

Salt solution	pH value
(A)	5.5
(B)	7.0
(C)	8.9

(1) Which of these salt solutions contains the highest concentration of hydrogen ions?

(2) Which of them has equal concentrations of hydrogen and hydroxide ions?

64 If you are given three bottles:

Bottle Number	Bottle Contents
(1)	Contains pure water with added ammonium chloride powder
(2)	Contains pure water with added sodium bicarbonate powder
(3)	Contains pure water with no additions

Based on your study, how can you distinguish between them?



Questions marked with are answered with explanations

First Multiple Choice Questions

Density and Relative Density

1 The measuring unit of relative density is

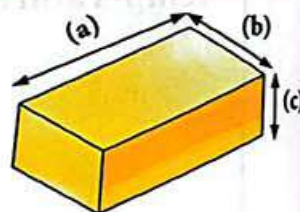
- (a) g/cm^3 (b) kg/cm^3 (c) g/cm^2 (d) It has no unit

2 A student wanted to measure the density of a liquid by determining its mass and volume. The instruments used in the measurement are

	Instrument for measuring mass	Instrument for measuring volume
(a)	Spring balance	Wooden ruler
(b)	Digital balance	Graduated cylinder
(c)	Spring balance	Conical flask
(d)	Digital balance	Glass beaker

3 The opposite figure shows the dimensions of a solid metallic object in the form of cuboid with mass (m). From the data of the figure, the density of the material of the object can be calculated from the relation

- (a) $m \times a \times b$ (b) $m \times a \times b \times c$
 (c) $\frac{m}{b \times c}$ (d) $\frac{m}{a \times b \times c}$



4 The candle floats on the surface of water, while it sinks in alcohol. This is explained by

- (a) The candle has a greater mass in alcohol
 (b) The mass of water is less than the mass of alcohol
 (c) The density of water is greater than the density of alcohol
 (d) All of the above are possible

5 The two physical quantities that must be measured for a body in order to know whether it floats or sinks when placed in water of density (1 g/cm^3) are

- (a) Mass and volume (b) Volume and area (c) Mass and area (d) Weight and area

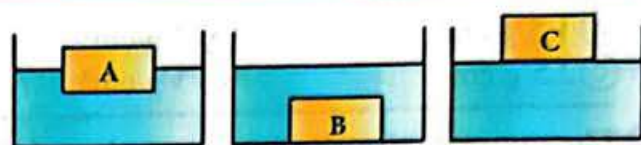
6 The opposite table shows the masses and volumes of four different substances (A), (B), (C), and (D) at the same temperature. The substance with the lowest density is

- (a) (A) (b) (B)
 (c) (C) (d) (D)

Substance	Volume (cm^3)	Mass (g)
(A)	2.0	5.4
(B)	3.0	13
(C)	6.0	15
(D)	5.0	18

- 7 One kilogram of iron is equal to one kilogram of sugar in
 (a) Volume only (b) Mass only (c) Density only (d) Density and volume

- 8 The opposite figure shows three objects (A), (B), and (C) placed in the same liquid, as shown in the figure. The relation between the densities of the three objects is



- (a) $\rho_A = \rho_C > \rho_B$ (b) $\rho_A > \rho_C > \rho_B$ (c) $\rho_B > \rho_A > \rho_C$ (d) $\rho_B > \rho_C > \rho_A$

- 9 If the density of gold at 4°C equals 19300 kg/m^3 , then the relative density of gold at the same temperature is (Given that the density of water is 1000 kg/m^3)

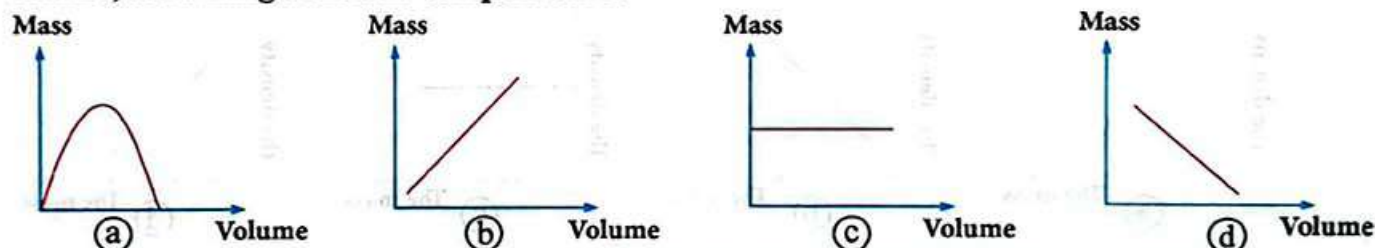
- (a) 19.3 (b) 1.93 (c) 193 (d) 0.193

- 10 The opposite figure shows the melting of an ice cube with a volume of 100 cm^3 and a density of 0.9 g/cm^3 into liquid water with a density of 1 g/cm^3 . The volume of water resulting from the complete melting of the ice is



- (a) 75 cm^3 (b) 80 cm^3 (c) 90 cm^3 (d) 100 cm^3

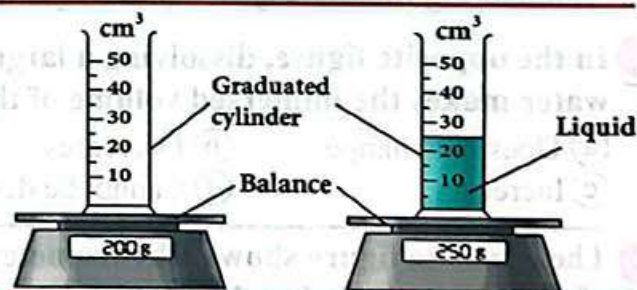
- 11 Which of the following graphs represents the relation between the mass of a liquid and its volume, assuming constant temperature?



- 12 The opposite figure shows an experiment to determine the density of a liquid by measuring its volume and mass.

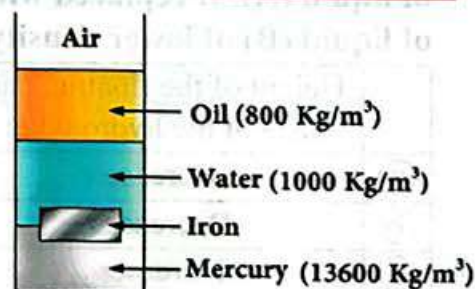
The density of this liquid equals

- (a) 0.5 g/cm^3 (b) 2 g/cm^3
 (c) 8 g/cm^3 (d) 10 g/cm^3



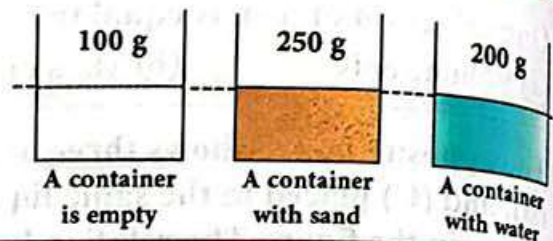
- 13 The opposite figure shows several immiscible liquids of known density settled inside a container. When a piece of iron was dropped into the container, it suspended as shown in the figure. The density of iron can be (kg/m^3)

- (a) 600 (b) 1000
 (c) 8000 (d) 14000



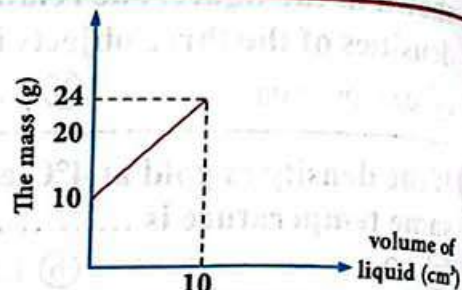
- 14 From the opposite figures, knowing water density = 1 g/cm^3 , the density of sand equals

(a) 1.5 g/cm^3 (b) 2 g/cm^3
 (c) 2.5 g/cm^3 (d) 3 g/cm^3



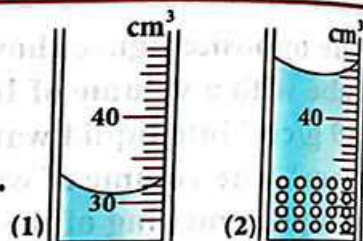
- 15 The opposite graph represents the relation between the mass of a container filled with a liquid and the volume of the added liquid at the same temperature. The density of the liquid equals

(a) 0.6 g/cm^3 (b) 0.8 g/cm^3
 (c) 1.4 g/cm^3 (d) 1.8 g/cm^3

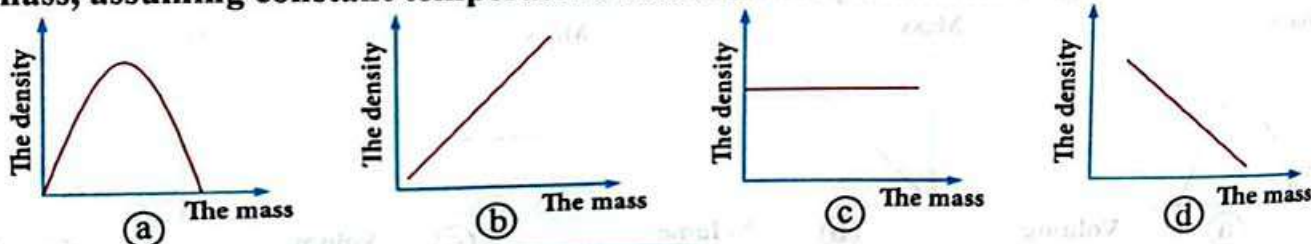


- 16 Figures (1) and (2) show an experiment to determine the mass of a small iron sphere. Figure (1) has a graduated cylinder with water, while Figure (2) shows it after adding (20) identical spheres. The mass of one sphere equals (Density of iron = 7.5 g/cm^3)

(a) 1.87 g (b) 2.75 g (c) 5.25 g (d) 16.9 g



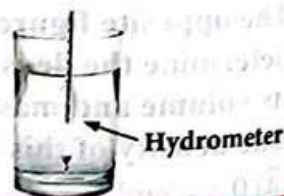
- 17 Which of the following figures represents the relation between the density of a liquid and its mass, assuming constant temperature



Measuring the density of liquids (Hydrometer)

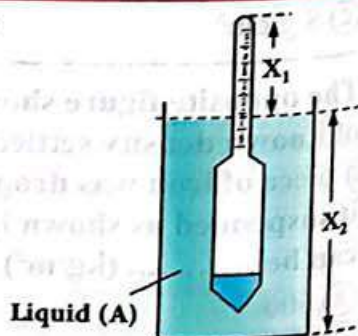
- 18 In the opposite figure, dissolving a large amount of salt in pure water makes the immersed volume of the hydrometer

(a) Does not change (b) Decreases
 (c) Increases (d) Cannot be determined



- 19 The opposite figure shows a hydrometer measuring the density of liquid (A). If replaced with the same amount of liquid (B) of lower density, then

	Height of the floating part (X_1) of the hydrometer	Height of liquid B in the container (X_2)
(a)	Decreases	Decreases
(b)	Decreases	Increases
(c)	Increases	Decreases
(d)	Increases	Increases

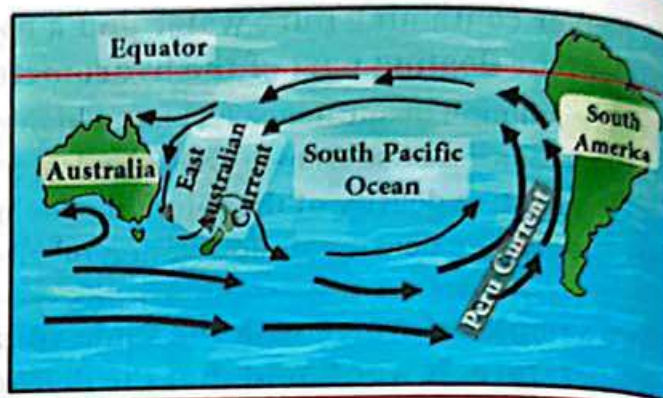


- 20** A beaker containing pure water and a hydrometer was used. When substance (X) is added, the floating part of the hydrometer increases. This means that
- The solution of substance (X) has a higher density than pure water
 - The solution of substance (X) has a lower density than pure water
 - The relative density of the solution of substance (X) is less than one
 - The relative density of the solution of substance (X) equals one
-
- 21** Two samples of water with the same volume were tested using the hydrometer at the same temperature. It was found that the density of one sample is greater than the other. Therefore, both samples
- Are considered pure water
 - Have the same mass
 - Have the same degree of purity
 - Have different degrees of purity
-
- 22** When measuring the densities of two liquids (A) and (B) using the hydrometer, the readings were 0.91 and 0.94 respectively. Which of the following is correct about liquids (A) and (B)? (Given that the two liquids do not mix)
- When mixed, liquid A floats on liquid B
 - When mixed, liquid B floats on liquid A
 - The floating part of the hydrometer in case (A) is larger
 - The floating part of the hydrometer in both cases is equal
-
- 23** In shallow waters, the density of water hardly changes with increasing depth because of
- Increase of dissolved salts
 - Decrease in temperature
 - Its incompressibility
 - Vertical water currents
-
- 24** At great depths, water pressure increases, leading to
- Separation of water molecules
 - Compression of water molecules
 - Increase in water density
 - Both (b) and (c)
-
- 25** Nutrients in oceans are transported from the deep ocean to the surface by
- Waves
 - Tides
 - Water currents
 - Both (a) and (c)
-
- 26** Differences in ocean water density are one of the causes of
- Ocean pollution
 - Ocean currents
 - Formation of icebergs
 - Few nutrients
-
- 27** By increasing salinity of water, the density of water
- Decreases
 - Increases
 - Does not change
 - Changes randomly
-
- 28** Ocean currents contribute to
- Transferring heat and salts from tropical regions to polar regions
 - Transferring nutrients from the deep ocean to the surface
 - Transferring freshwater flowing from glaciers to different places
- (I) and (II) only
 - (I) and (III) only
 - (II) and (III) only
 - (I), (II), and (III)

- 29 The opposite figure shows the Peru Current and the East Australian Current.

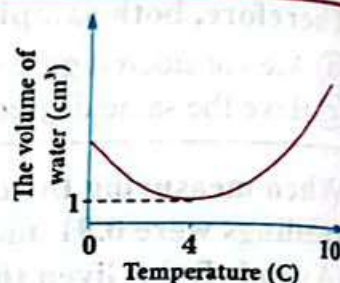
They are classified as

- (a) Both are cold currents
(b) Only the Peru Current is warm
(c) Both are warm currents
(d) Only the Peru Current is cold

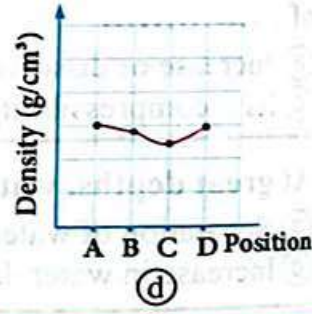
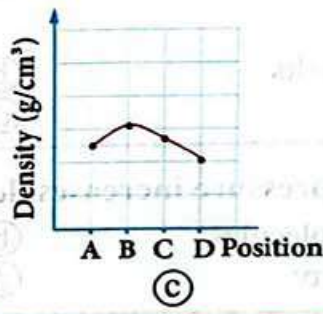
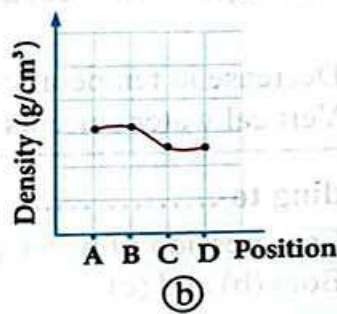
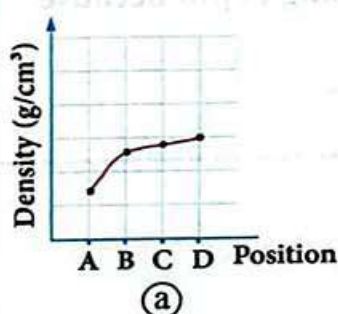
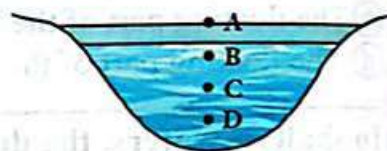


- 30 Study the opposite graph, then state in which temperature range pure water behaves differently from most liquids?

- (a) From 0°C to 4°C , mass constant, density increases
(b) From 0°C to 4°C , density constant, mass increases
(c) From 4°C to 10°C , mass constant, density decreases
(d) From 4°C to 10°C , density constant, mass decreases

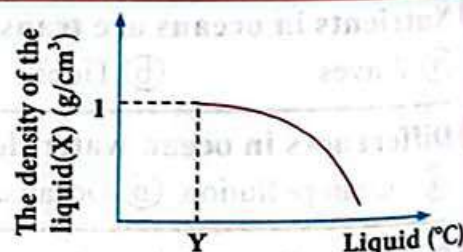


- 31 You are given a picture of a lake where a drop in temperature formed a surface ice layer. Which graph correctly shows the density of water at positions (A, B, C, D)?



- 32 Study the opposite graph: Which of the following correctly represents liquid (X) and temperature (Y)?

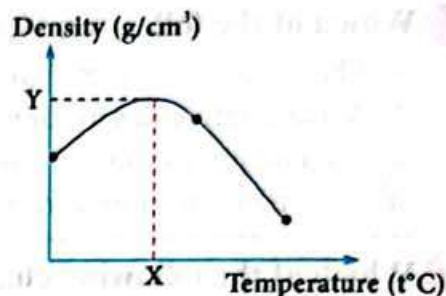
	Liquid (X)	Temperature (Y)
(a)	Pure water	3°C
(b)	Pure water	4°C
(c)	Impure water	3°C
(d)	Impure water	4°C



- 33 If the temperature of water gradually increases from 0°C to 20°C , then the density of water

- (a) Decreases
(b) Increases
(c) Is not affected
(d) Increases until it reaches its maximum value, then decreases

- 34 The opposite figure represents the relation between the density of pure water and temperature. The values of both X and Y on the figure are



	The value (X)	The value (Y)
(a)	2°C	4 g/cm ³
(b)	4°C	1 g/cm ³
(c)	0°C	1 g/cm ³
(d)	5°C	4 g/cm ³

- 35 Why does ice become less dense than water?
- Because water molecules get closer in ice
 - Because ice molecules are more spread out than water molecules
 - Because ice contains air bubbles
 - Because ice melts quickly
- 36 The density of ocean water changes according to which of the following factors?
- Its temperature
 - Salinity
 - Water pressure
 - All of the above
- 37 What mainly causes water molecules to be more spread out in ice than in liquid water?
- High temperature
 - Low pressure
 - Type of Hydrogen bonds forming a crystal structure
 - Presence of impurities in water
- 38 What is the relation between the volume of water and its density when its temperature rises above 4°C?
- Volume increases and density decreases
 - Volume decreases and density increases
 - Volume increases and density increases
 - Volume decreases and density decreases
- 39 The relation between the temperature of pure water and its volume (when its temperature increases from 0°C to 4°C) is a relation
- Inverse
 - Direct
 - Irregular
 - No relation
- 40 A layer of ice forms in lakes in polar regions at
- The bottom of the lake, providing a habitat for polar animals
 - The bottom of the lake, and the water temperature rises at the surface
 - The surface of the lake, acting as an insulator for the rest of the water
 - The surface of the lake because ice is denser than water
- 41 The internal energy of a body depends on
- The energy resulting from the motion of the molecules
 - The energy resulting from the positions of the molecules relative to each other
 - The energy required to heat the substance
- (I) and (II) only
 - (I) and (III) only
 - (II) and (III) only
 - (I), (II), and (III)

42 Which of the following expresses the concept of temperature?

- (a) The energy transferred to, from, or through a body
- (b) A quantitative description of how hot or cold a body
- (c) The energy resulting from the motion of the molecules of the substance
- (d) The energy resulting from the positions of the molecules

43 Which of the following changes occur when a body or system is cooled?

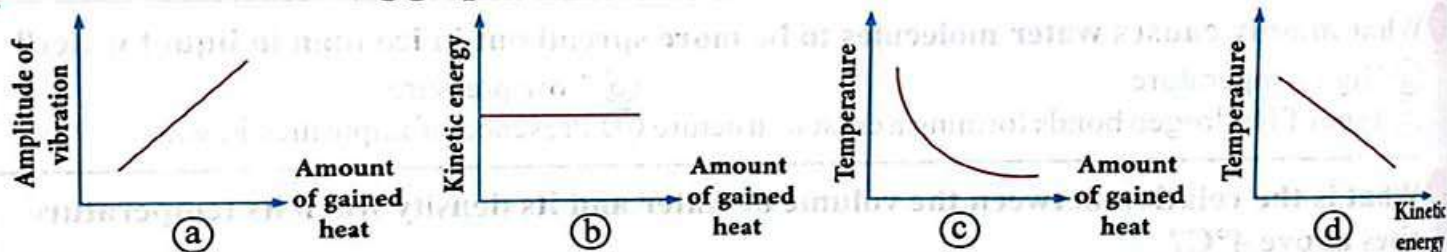
- (I) The amplitude of vibration of the molecules in the substance or system decreases
- (II) The potential energy of the molecules decreases and their speed increases
- (III) The internal energy of the body or system decreases

- (a) (I) and (II) only
- (b) (I) and (III) only
- (c) (II) and (III) only
- (d) (I), (II), and (III)

44 An increase in the temperature of a body by one-degree Celsius means

- (a) A decrease in the average kinetic energy of the body's molecules
- (b) An increase in the body's temperature by 274 Kelvin
- (c) An increase in the body's temperature by one Kelvin
- (d) A decrease in the body's internal energy

45 Which of the following graphs is correct?



46 If the temperature of a body equals 30°C , then on the Kelvin scale it equals

- (a) 273 K
- (b) 8190 K
- (c) 303 K
- (d) 243 K

47 Body (A) is in contact with body (B) which has a higher temperature. Heat energy transfers from and stops when

- (a) A to B / A becomes hotter than B
- (b) A to B / A and B become equal
- (c) B to A / A becomes hotter than B
- (d) B to A / A and B become equal

48 A body has a temperature of 220 K which changed to 3°C . The average kinetic energy of the body's molecules

- (a) Increases
- (b) Decreases
- (c) Does not change
- (d) No correct answer

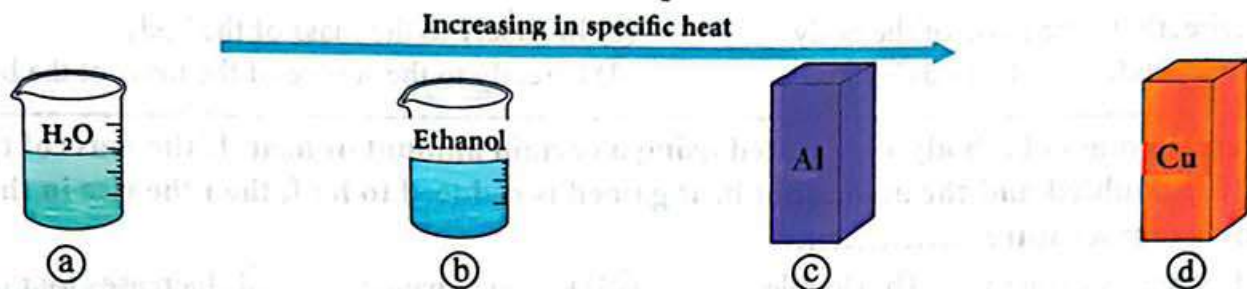
49 The specific heat of a substance changes when of the substance changes.

- (a) The physical state
- (b) The mass
- (c) The temperature
- (d) The volume

50 If the temperature of a body is doubled, its specific heat

- (a) Decreases to one third
- (b) Increases to three times
- (c) Increases to double
- (d) Remains constant

- 51 Which of the following substances requires a certain mass of it less energy to change its temperature by the same amount in the same period of time?



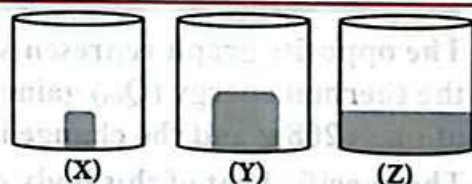
- 52 The following table shows the specific heat capacities of four different substances. When heating 70 g of each substance under the same conditions; Which of them will heat up first?

Substance	(A)	(B)	(C)	(D)
Specific heat (J/Kg.K)	385	130	710	450

- (a) A (b) B (c) C (d) D
- 53 If the specific heat of aluminum is 897 J/kg.K and the specific heat of copper is 385 J/kg.K, and equal masses of aluminum and copper are exposed to the same amount of heat for the same period of time, which of the following changes is expected to occur?
- (a) The final temperature of aluminum = The final temperature of copper
 (b) The final temperature of aluminum is higher than the final temperature of copper
 (c) The final temperature of aluminum is lower than the final temperature of copper
 (d) The temperature of aluminum increases while the temperature of copper decreases

- 54 The opposite figure shows three samples of aluminum:

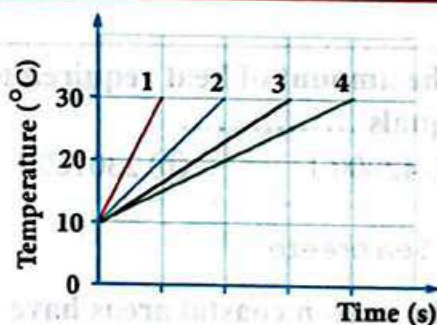
(X): a 5 g solid piece (Y): a 10 g solid piece
 (Z): a 10 g molten piece,



Which of the previous samples have the same specific heat?

- (a) (X), (Y) (b) (Y), (Z) (c) (X), (Z) (d) (X), (Y), (Z)

- 55 Four liquid substances (1), (2), (3), and (4) have the same mass and the same initial temperature. They were placed in identical containers and heated under the same conditions. The opposite graph shows their temperature change over time. Which liquid has the lowest specific heat?

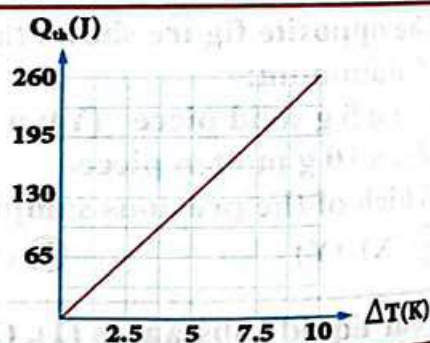


- (a) Liquid (1) (b) Liquid (2)
 (c) Liquid (3) (d) Liquid (4)

- 56 The factors on which the amount of heat lost or gained by a substance depends when its temperature changes are

- (a) The mass and density of the substance (b) The specific heat of the substance only
 (c) The mass of the substance and its specific heat (d) The mass of the substance only

- 57 When a body gains a certain amount of heat, the change in its temperature is proportional
- (a) Directly to the mass of the body (b) Inversely to the mass of the body
(c) Independent of the body's mass (d) Directly to the square of the mass of the body
- 58 A certain mass of a body was heated using a certain amount of heat. If the mass of the body is doubled and the amount of heat gained is reduced to half, then the rise in the body's temperature
- (a) Decreases to quarter (b) Doubles (c) Does not change (d) Increases four times
- 59 How much thermal energy does water lose when its temperature decreases by (8°C) , given that the mass of water is (200 g) and its specific heat is approximately (4200 J/kg.K) ?
- (a) 6720 J (b) 67200 J (c) 672000 J (d) 6720000 J
- 60 A piece of metal with a mass of (100 g) gained (2340 J) of heat, raising its temperature from (20°C) to (80°C) . The specific heat of this metal is
- (a) (0.39 J/Kg.K) (b) (39 J/Kg.K) (c) (390 J/Kg.K) (d) (3.9 J/Kg.K)
- 61 When mixing 100 g of water at a temperature of 53°C with 200 g of water at a temperature of 23°C , the temperature of the mixture becomes equal to (assuming no energy loss)
- (a) 33 K (b) 303 K (c) 33°C (d) 38°C
- 62 The opposite graph represents the relation between the thermal energy (Q_{th}) gained by a metallic body of mass 208 g and the change in its temperature (ΔT). The specific heat of this body equals
- (a) 120 J/Kg.K (b) 130 J/Kg.K
(c) 125 J/Kg.K (d) 135 J/Kg.K
- 63 The amount of heat required to raise the temperature of 1 kg of glass from 30°C to 304°C equals (Given that the specific heat of glass = 840 J/kg.K)
- (a) 42000 J (b) 230160 J (c) 840 J (d) 71400 J



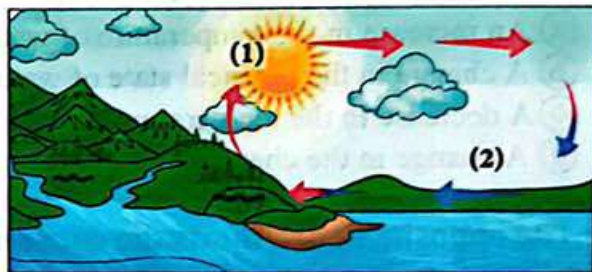
Sea breeze

- 64 The reason coastal areas have a moderate climate compared to inland areas is
- (a) Low evaporation in water (b) The high specific heat of water
(c) The low relative density of water (d) The increased salinity of seawater
- 65 The high specific heat of water makes the waters of oceans and seas
- (a) Gain and lose heat quickly (b) Unaffected by the sun's temperature
(c) Gain and lose heat slowly (d) Always maintain a constant temperature

- 66 Which of the following expresses the movement of cool air (breeze) during the day and night in coastal areas?

	Movement of cool air during the day	Movement of cool air at night
(a)	From sea to land	From sea to land
(b)	From sea to land	From land to sea
(c)	From land to sea	From land to sea
(d)	From land to sea	From sea to land

- 67 The opposite figure represents one of the phenomena resulting from the high specific heat of water. Which of the following is correct about the opposite figure?



- (a) (1): Cold air with higher density
(b) (2): Hot air with lower density
(c) The air in direction (1) is called sea breeze
(d) The air in direction (2) is called sea breeze

- 68 When comparing coral reefs with cold-blooded marine organisms, we find that

	Coral reefs	Cold-blooded marine organisms
(a)	Withstand temperature changes	Do not withstand temperature changes
(b)	Live in cold surface waters	Live in the depths of seas and oceans
(c)	Do not withstand temperature changes	Withstand temperature changes
(d)	Need a specific temperature to stay alive	Their body temperature depends on the temperature of the surrounding environment

- 69 The latent heat of vaporization is defined as

- (a) The thermal energy required to raise the temperature of 1 kg of a substance
(b) The thermal energy absorbed by a unit mass of the substance
(c) The thermal energy released from the substance when it freezes
(d) The thermal energy required only to break hydrogen bonds

- 70 Why does water have a high latent heat of vaporization?

- (a) Because of the small size of its molecules
(b) Because of the presence of hydrogen bonds between its molecules
(c) Because of its low boiling point
(d) Because of its inability to transfer heat

- 71 Living organisms benefit from the evaporation of water from their bodies because evaporation works on

- (a) Increasing their weight
(b) Regulating their body temperature
(c) Supplying their bodies with energy
(d) Increasing the rate of biochemical reactions

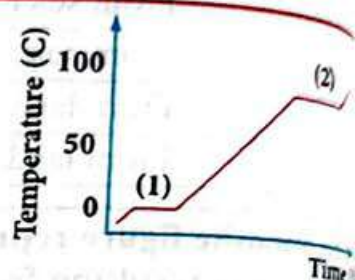
- 72 During sweating in humans or animals, the evaporated water molecules help regulate body temperature by

- (a) Increasing body temperature
(b) Causing the body to lose heat
(c) Increasing body moisture
(d) Increasing blood pressure

73 During the change from liquid to gas (vapor) state by latent heat of vaporization, what happens to the substance's temperature?

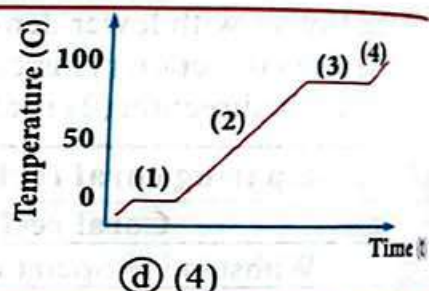
- (a) Increases (b) Decreases (c) Does not change (d) Vibrates

74 The opposite figure shows the curve of the change in water temperature over time when it is gradually heated from the solid state (ice) to the gaseous state (vapor), showing the change in physical state. What do the two horizontal parts (1) and (2) of the curve represent?



- (a) An increase in the temperature of water
 (b) A change in the physical state of water while the temperature remains constant
 (c) A decrease in the temperature of water
 (d) A change in the chemical composition of water

75 The opposite figure shows the curve of the change in water temperature over time when it is heated from the solid state to the gaseous state. Which of the parts (1), (2), (3), (4) of the curve represent the latent heat of vaporization?

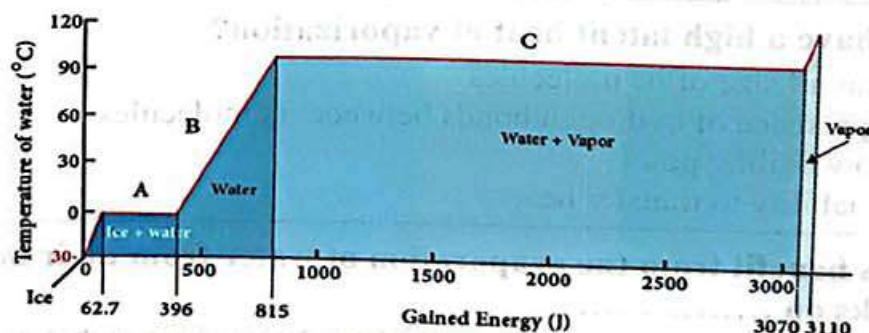


- (a) (1) (b) (2) (c) (3) (d) (4)

76 Why does the evaporation of water require much more energy than heating it from 0°C to 100°C for the same mass?

- (a) Because water has a high specific heat capacity
 (b) Because evaporation requires breaking the hydrogen bonds between water molecules
 (c) Because the boiling point of water is very high
 (d) Because the latent heat of vaporization is less than the heat required for heating

77 The following graph shows the relation between the absorbed thermal energy and the temperature of water, illustrating latent heat of vaporization.



What is the essential difference between the energy absorbed in region (B) and region (C)?

- (a) In (B) the state of matter changes, while in (C) it does not
 (b) In (B) the temperature does not change, while in (C) it changes
 (c) In (B) the temperature changes and the state of matter does not, while in (C) the state of matter changes and the temperature does not
 (d) There is no essential difference

- 78** For living organisms to stay alive, this requires
- (a) A wide range of temperatures (b) A specific range of temperatures
(c) Any temperature (d) Very low temperatures
-
- 79** Sharp changes in temperature are especially fatal for organisms that are
- (a) Large in size (b) Very small
(c) Warm-blooded (d) Living in the depths of the oceans
-
- 80** What may result from temperature changes due to climate change for coral reefs?
- (a) Their growth (b) Their reproduction (c) Their death (d) Their spread
-
- 81** Why are oceans and lakes considered massive heat reservoirs?
- (a) Because of the low specific heat of water (b) Because of the high specific heat of water
(c) Because of their large size only (d) Because of their ocean currents
-
- 82** What helps maintain stable temperatures in the surrounding marine environment?
- (a) Absorption of solar energy by water at night (b) Slow release of solar energy by water at night
(c) Lack of absorption of solar energy by water (d) Significant rise in water temperature
-
- 83** What property that helps protecting marine organisms from rapid changes in temperature?
- (a) Low specific heat of water (b) High specific heat of water
(c) Rapid evaporation of water (d) Low salinity of water
-
- 84** Cold-blooded organisms (Poikilotherms) are organisms that
- (a) Keep their body temperature constant
(b) Depend on the surrounding environment for their body temperature
(c) Live only in warm environments
(d) Live only in cold environments
-
- 85** Cold-blooded marine organisms are most often found
- (a) In warm surface waters (b) In the depths of seas and oceans
(c) In polar regions (d) On land
-
- 86** Examples of cold-blooded organisms include
- (a) Birds and mammals
(b) Most vertebrates such as fish, amphibians, and reptiles
(c) All marine organisms
(d) Organisms that live on land
-
- 87** How can warm-blooded organisms maintain a constant internal body temperature?
- (a) By relying on the environment through metabolism
(b) Through metabolism
(c) By seeking external heat sources
(d) Through rapid cooling
-
- 88** Examples of warm-blooded organisms include
- (a) Fish and amphibians (b) Invertebrates and arthropods
(c) Birds and mammals (d) Reptiles and mollusks

89 Do the body temperatures of warm-blooded organisms change with changes in the surrounding environment?

- (a) Yes, they change significantly
- (b) Yes, they change slightly
- (c) No, they stay constant regardless of environmental temperature
- (d) No, they change only under extreme conditions

Second Essay Questions

90 Write the scientific term that corresponds to each of the following statements:

- (1) The mass of a unit volume of matter at a certain temperature.
- (2) A device used to measure the density of liquids.
- (3) The movement of ocean water between regions, carrying heat, salts, and nutrients.
- (4) A physical property of water, varying with pressure, temperature, and salinity, causes ocean currents.
- (5) The sum of the potential and kinetic energies of the molecules of a body or system.
- (6) The energy transferred between two bodies of different temperatures.
- (7) The heat needed to raise the temperature of 1 kg of a substance by 1 °C or 1 K.
- (8) A transparent liquid with high specific heat that moderates coastal climate in summer.
- (9) Cool air moving from the sea surface to the land surface in the morning in coastal areas.
- (10) The thermal energy absorbed by a unit mass (1 kg) of a substance to change it from the liquid state to the gaseous state (vapor state) without a change in temperature.
- (11) A process used by living organisms to regulate their body temperature, in which evaporated water molecules carry heat away from the body.
- (12) A bond between water molecules that requires much energy to break during evaporation.

91 What are the results of:

- (1) Contact between two bodies of different temperatures.
- (2) Two balls of equal mass, one made of copper and the other of iron, gain the same amount of heat. (Given that the specific heat of copper is smaller than that of aluminum).
- (3) Cooking pots being made from a metal with relatively high specific heat.
- (4) Melting a piece of ice and then evaporating the liquid water, in relation to specific heat.
- (5) The strength of hydrogen bonds between water molecules, in relation to specific heat.
- (6) A decrease in air temperature from 4 °C to 0 °C, over a water surface.
- (7) Absorption of latent heat of vaporization by 1 kg of a substance.
- (8) The presence of hydrogen bonds between water molecules, in relation to its latent heat.
- (9) Water absorbing thermal energy without a change in its temperature during evaporation.
- (10) The high specific heat of water in oceans and lakes.
- (11) Cold-blooded organisms (Poikilotherms) depend on the surrounding temperature.
- (12) Warm-blooded organisms being able to maintain a constant internal body temperature.

92 Give reasons for the following:

- (1) The temperature of a body is considered a measure of its internal energy.
- (2) Copper heats faster than aluminum when equal masses receive the same amount of heat.
- (3) Water has a high specific heat.
- (4) Water plays a major role in moderating the climate of coastal cities in summer.

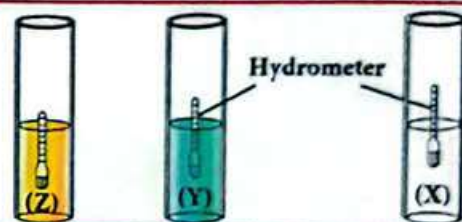
- (5) Cold-blooded organisms live at the bottom of seas and oceans.
- (6) Water has a high latent heat.
- (7) Living organisms use water evaporation as a mechanism to regulate their body temperature.
- (8) Most living organisms require a specific range of temperatures to survive.
- (9) A change in temperature leads to the death of coral reefs.
- (10) Cold-blooded organisms are often found in the depths of seas and oceans.

93 A graduated cylinder contains 50 ml of water, and the total mass of the cylinder with water is 70 g. After an object is carefully dropped into the cylinder, the water level rises to 80 ml, and the total mass becomes 90 g. Calculate each of the following:

- (1) The volume of the object.
- (2) The mass of the object.
- (3) The density of the object.

94 Compare between the absolute density of a substance and its relative density in terms of (definition – unit of measurement).

95 The opposite figure shows the measurement of the density of three liquids (X), (Y), and (Z) using the hydrometer. Arrange the three liquids in descending order according to their density.



96 The density of water at the bottom of the ocean varies, but in general, it is higher than at the surface, as density increases with depth and may reach 1050 kg/m^3 or more in the ocean depths. In light of the previous statement, explain the reason for the increase in ocean water density with depth.

97 Explain the role of water currents resulting from variations in temperature and salinity in an aquatic environment.

98 The figure shows two lakes (A) and (B). Study them carefully, then answer:

- (1) Which lake is more exposed to depletion and loss of fish resources? Explain.



Lake (A)

The prevailing direction of water



Lake (B)

- (2) In which lake is pressure difference the main cause of water movement?

99 If the temperature of a piece of iron is 325 Kelvin, how much does this equal on the Celsius scale?

100 To heat a quantity of water from 5°C to 100°C , an amount of heat equal to 22500 J is required. Calculate the mass of water, given that the specific heat of water = $4.184 \text{ J/g}^\circ\text{C}$.

101 If the heat required to raise the temperature of 1 kg of aluminum by 1 K is 894 J, while the heat released by lowering the temperature of 1 kg of copper by 1 K is 358 J, which metal is more suitable for cooking utensils in terms of faster heat exchange, and why?

102 If a mass of 0.5 kg of lead gains 5000 J of thermal energy, and its temperature changes by 76.9°C , calculate the specific heat of lead.



Questions marked with are answered with explanations

First Multiple Choice Questions

- 1 When dissolving a certain amount of table salt in a cup of water, the result is
 - (a) A homogeneous mixture, where water is the solvent
 - (b) A heterogeneous mixture, where water is the solvent
 - (c) A homogeneous mixture, where water is the solute
 - (d) A heterogeneous mixture, where water is the solute
- 2 The colligative properties of solutions differ according to
 - (a) The type of solute
 - (b) The type of solvent
 - (c) The number of solute particles
 - (d) The specific heat of the solute
- 3 Which of the following is not considered a colligative property of solutions?
 - (a) Boiling point
 - (b) Freezing point
 - (c) Osmotic pressure
 - (d) Density
- 4 What is meant by the state of dynamic equilibrium between a liquid and its vapor?
 - (a) Evaporation stops while condensation continues
 - (b) Continuous increase in the number of liquid molecules
 - (c) Only evaporation occurs without condensation
 - (d) Evaporation and condensation occur at equal rates
- 5 Which of the following graphs represents the relationship between the attractive forces among water molecules and the attractive forces between water molecules and solute molecules?

(a) State

(b) State

(c) State

(d) State

■ Attractive forces among water intermolecular forces
 ■ Attractive forces between water intermolecular forces
- 6 What is the main reason for the decrease in the vapor pressure of water in solutions compared to pure water?
 - (a) The bonding forces between water and solute molecules cannot be overcome
 - (b) Weakening of the hydrogen bonds between water molecules
 - (c) Solute particles reduce the number of water molecules at the surface that can evaporate
 - (d) Increase in the number of water molecules that can evaporate in the solution

7 When comparing pure water with seawater,

- (a) The vapor pressure of pure water is lower than that of seawater
- (b) The number of water vapor molecules above the liquid surface is greater in seawater
- (c) The vapor pressure of seawater is lower than that of pure water
- (d) The density of seawater is lower than that of pure water

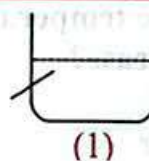
8 When a quantity of a non-volatile substance is dissolved in one liter of distilled water, which of the following choices is correct?

	Density	Boiling point	Vapor pressure
(a)	Decreases	Decreases	Increases
(b)	Decreases	Increases	Decreases
(c)	Increases	Increases	Increases
(d)	Increases	Increases	Decreases

9 Study the opposite figure, then answer:

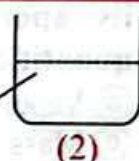
Which of the following statements is correct regarding solutions (1) and (2)?

1 liter of pure water
+
1 g of table salt



(1)

1 liter of pure water
+
2 g of table salt



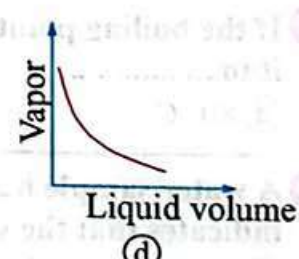
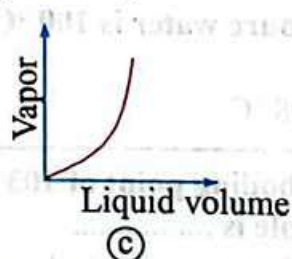
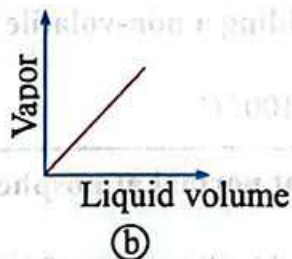
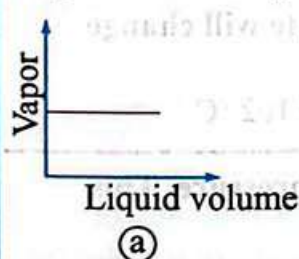
(2)

- (a) The freezing point of solution (1) is lower than that of solution (2)
- (b) The boiling point of solution (1) is lower than that of solution (2)
- (c) The freezing point of solution (2) is higher than that of solution (1)
- (d) The boiling point of solution (2) is lower than that of solution (1)

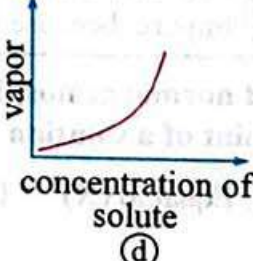
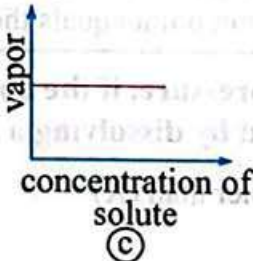
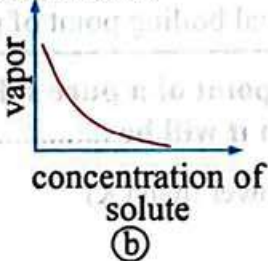
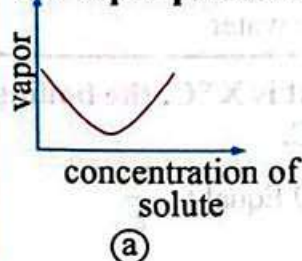
10 What is the relation between the decrease in the vapor pressure of a solution and the number of solute ions in the solution?

- (a) Direct
- (b) Inverse
- (c) Constant
- (d) Increasing then decreasing

11 Which of the following graphs correctly represents the relation between the volume of a liquid and its vapor pressure at constant temperature?



12 Which of the following graphs shows the relation between solute ion concentration and the vapor pressure of a solution?



- 13** Which of the following describes the relation between a solution's concentration and the rate of water evaporation?
- The rate of evaporation increases as concentration increases
 - The rate of evaporation decreases as concentration increases
 - There is no relation between concentration and evaporation rate
 - The relation depends on the type of solute
- 14** How does increasing solute particle number affect the properties of a solution?
- Increases the number of water molecules that can evaporate
 - Reduces the attractive forces between water and solute
 - Decreases the vapor pressure of the liquid
 - Has no effect on vapor pressure
- 15** The figure shows a closed container with a liquid in equilibrium with its vapor. When the temperature is decreased, which of the following quantities will increase?
- Vapor pressure
 - Mass of the liquid
 - Mass of the vapor
 - Rate of evaporation
- 
- 16** A liquid reaches its boiling point when
- All of its molecules are changed from the liquid state to the gaseous state
 - All of its molecules are changed from the liquid state to the solid state
 - The vapor pressure of the liquid equals the external pressure
 - The external pressure is greater than the vapor pressure
- 17** Two identical closed containers, one with pure water and the other with a sugar solution, are heated. Which will reach its boiling point first?
- Pure water
 - Sugar solution
 - They boil at the same time
 - It depends on the volume of the container
- 18** If the boiling point of pure water is 100 °C, adding a non-volatile solute will change it to
- 80 °C
 - 98 °C
 - 100 °C
 - 102 °C
- 19** A water sample has a boiling point of 103 °C at normal atmospheric pressure. This indicates that the sample is
- Pure, because its boiling point equals the normal boiling point of pure water
 - Pure, because its boiling point is higher than the normal boiling point of pure water
 - Impure, because its boiling point is higher than the normal boiling point of pure water
 - Impure, because its boiling point equals the normal boiling point of pure water
- 20** At normal atmospheric pressure, if the boiling point of a pure solvent is X °C, the boiling point of a solution formed by dissolving a salt in it will be °C.
- Equal to (X)
 - Higher than (X)
 - Lower than (X)
 - Equal to $\frac{X}{2}$

21 If the boiling point of a liquid is $X^{\circ}\text{C}$ at sea level and $Y^{\circ}\text{C}$ on top of a mountain, what is the ratio $X : Y$?

- (a) Greater than one (b) Less than one (c) Equal to zero (d) Equal to one

22 What is the expected boiling point of water at the top of Mount Everest, shown in the figure?

- (a) 100°C (b) 120°C
(c) 102°C (d) 71°C



23 The boiling point of water varies with pressure. The correct order of boiling points for the same water sample at the following locations is

- (a) Top of a mountain > Sea level > 500 m below sea level
(b) Top of a mountain > 500 m below sea level > Sea level
(c) 500 m below sea level > Sea level > Top of a mountain
(d) Sea level > 500 m below sea level > Top of a mountain

24 A student conducted an experiment to compare the boiling point of water under three conditions, as shown in the table.

T_1	Boiling point in a pressure cooker
T_2	Boiling point in an open pot at sea level
T_3	Boiling point in an open pot on top of a mountain

Based on this, which of the following correctly represents the relationship between the three temperatures?

- (a) $T_1 > T_2 > T_3$ (b) $T_3 > T_2 > T_1$
(c) $T_1 = T_2 = T_3$ (d) $T_3 > T_1 > T_2$



T_1



T_2



T_3

25 If the boiling point of acetic acid at 1 atm is 118°C , its expected boiling point at 0.8 atm is

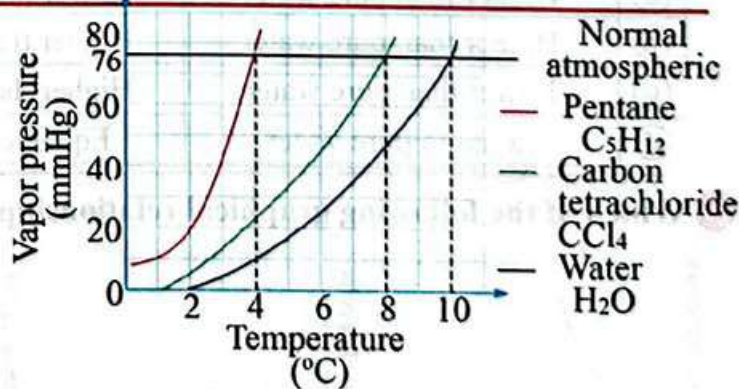
- (a) 111°C (b) 118°C (c) 119°C (d) 125°C

26 What is the effect of dissolving a non-volatile substance in a given volume of pure water on the freezing point and vapor pressure, respectively?

- (a) Increases, increases (b) Decreases, decreases
(c) Increases, decreases (d) Decreases, increases

27 The graph shows the variation of vapor pressure with temperature for three liquids. Which of the following represents the correct order of their boiling points?

- (a) Water < carbon tetrachloride < pentane
(b) Carbon tetrachloride < water < pentane
(c) Pentane < water < carbon tetrachloride
(d) Pentane < carbon tetrachloride < water



28

If the following solutions have equal concentrations, which one has the highest boiling point?

(a) KCl

(b) Na_2CO_3 (c) $\text{Al}_2(\text{SO}_4)_3$ (d) FeCl_3

29

The opposite figure shows the process of spreading amounts of salt on the road in cold regions after rainfall. Study it, then determine: What is the purpose of this?



- (a) To increase the freezing point of rainwater
 (b) To increase the amount of snow on the road
 (c) To prevent rainwater from freezing into ice
 (d) To decrease the vapor pressure of rainwater

30

Which of the following types of water has the lowest freezing point?

(a) Drinking water

(b) River water

(c) Ocean water

(d) Freshwater Lake

31

If the following solutions have equal concentrations, which one has the highest freezing point?

(a) Ammonium chloride NH_4Cl (b) Aluminum chloride AlCl_3 (c) Magnesium chloride MgCl_2 (d) Aluminum sulphate $\text{Al}_2(\text{SO}_4)_3$

32

If one mole of is dissolved in one liter of water, it will cause the greatest depression of the freezing point.

(a) KI

(b) MgCl_2

(c) NaCl

(d) AlCl_3

33

Which of the following correctly describes the effect of adding a non-volatile solute to water?

- (a) The boiling point decreases, and the freezing point decreases
 (b) The boiling point increases, and the freezing point decreases
 (c) The boiling point decreases, and the freezing point increases
 (d) Both the boiling point and the freezing point remain unchanged

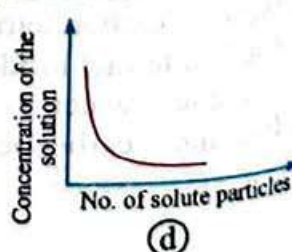
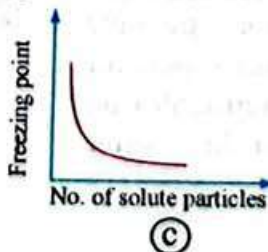
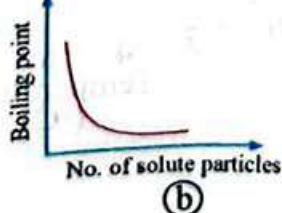
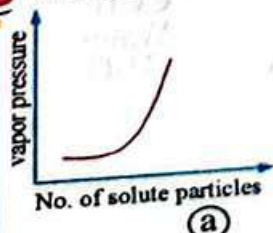
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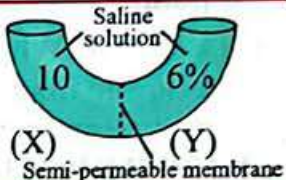
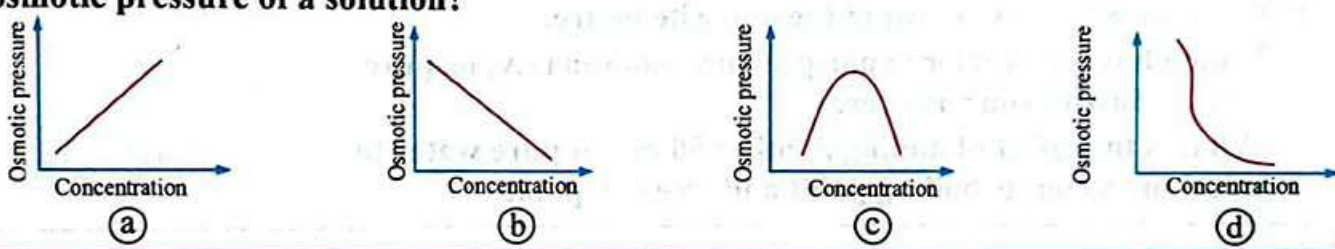
Which of the following choices shows the difference between pure water and a saline solution such as NaCl in terms of boiling point and freezing point?

	Freezing point of the solution	Boiling point of the solution
(a)	Higher than pure water	Lower than pure water
(b)	Higher than pure water	Higher than pure water
(c)	Lower than pure water	Higher than pure water
(d)	Equal to pure water	Equal to pure water

35

Which of the following graphical relationships is correct for an aqueous solution?



- 36** The solution with the higher concentration has an osmotic pressure that is
- Higher, and it pulls water from the less concentrated solution
 - Higher, and it pushes water toward the less concentrated solution
 - Lower, and it pulls water from the less concentrated solution
 - Lower, and it pushes water toward the less concentrated solution
- 37** The movement of water between two solutions separated by a semipermeable membrane stops when both solutions
- Have the same temperature
 - Contain the same amount of water
 - Contain the same amount of solute
 - Have equal solute concentrations
- 38** In the figure, a 10% saline solution is placed on side (X) and a 6% saline solution on side (Y). What happens after some time?
- Salt moves from (X) to (Y)
 - Salt moves from (Y) to (X)
 - Water moves from (X) to (Y)
 - Water moves from (Y) to (X)
- 
- 39** Which of the following graphs shows the relation between solute concentration and the osmotic pressure of a solution?
- 
- 40** You have two cells, each weighing 8 nanograms. The first is placed in pure water, and the second in a concentrated sugar solution. What is the expected weight of each after one hour?
- Both: 6 ng
 - Both: 10 ng
 - First: 10 ng, Second: 6 ng
 - First: 6 ng, Second: 10 ng

Second Essay Questions

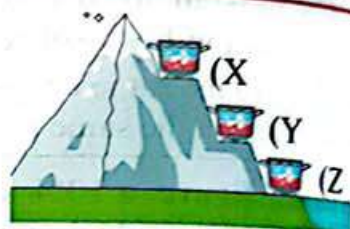
- 41** Write the scientific term that corresponds to each of the following statements:
- A homogeneous mixture consisting of a solvent and a solute.
 - The state in which the rate of evaporation of a liquid equals the rate of condensation of its vapor at a certain temperature in a closed container.
 - The temperature at which the vapor pressure of a liquid equals the atmospheric pressure acting on its surface.
- 42** Correct the mistakes in the following statements:
- The colligative properties of a solution depend on the type of solute particles.
 - The vapor of a liquid formed above its surface exerts a pressure on the surface of the liquid called the osmotic pressure of the liquid.
 - The decrease in the vapor pressure of a solution is inversely proportional to the number of solute molecules or ions in the solution.
 - The freezing point of a solution is always equal to the freezing point of pure water at normal atmospheric pressure.
 - The boiling point of a solution is equal to the boiling point of pure water at normal atmospheric pressure.

43 Give reasons for the following:

- (1) The boiling point of a solution is higher than that of pure water at the same atmospheric pressure.
- (2) Salt is spread on roads in cold regions after rainfall.
- (3) Colligative properties depend on the number of solute particles, not on their type.

44 The figure shows three containers, each with the same solution, placed at different heights above sea level.

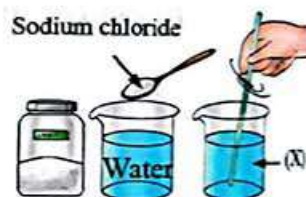
- (1) At which height does the solution have the highest boiling point?
- (2) Explain: Why the boiling point of the solution at height (X) is lower than its boiling point at height (Y).



45 According to your study, how can you determine the purity of a liquid?

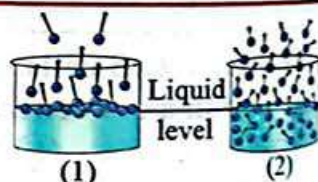
46 A saline solution (X) was prepared by dissolving 5 g of table salt in 50 mL of water, as shown in the opposite figure.

- (1) Which has the greater vapor pressure: solution (X) or pure water? Justify your answer.
- (2) What is the effect of adding another 50 mL of pure water to solution (X) on its boiling point and freezing point?



47 The opposite figure shows two containers (1) and (2) in the same room, each containing pure water at a different temperature.

- (1) What physical process is occurring in the water inside the two containers?
- (2) In which container is the difference between the vapor pressure of the water and the atmospheric pressure greater?



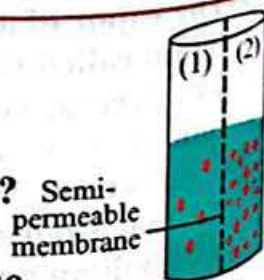
48 While conducting an investigation to measure the boiling point of water in different locations on Earth, it was found that pure water in Djibouti boils at a temperature higher than 100 °C. How can you explain this?

49 If compound (A) evaporates faster than compound (B) at 25 °C, answer the following:

- (1) Which compound has stronger intermolecular forces?
- (2) Which compound has a higher vapor pressure at 25 °C?
- (3) Which compound has a higher boiling point?

50 The opposite figure shows a container holding two sucrose solutions of different concentrations separated by a semipermeable membrane. Study it carefully, then answer:

- (1) Which of the two solutions will increase in volume after some time? Why?
- (2) Which of the two solutions will increase in concentration after some time? Why?



حمل الآن

مجاناً وحصرياً

المراجعة رقم (3)

اختبار شهر اكتوبر





October Revision

★(1) **Choose the right answer:**

Mr. Ahmed Elbasha

1. In mammals, the percentage of water is about% of the organism's body mass.
a. 23 b. 47 c. 70 d. 90
2. Which of the following most of it consists of water?
a. Cell wall. b. Mitochondria. c. Nucleus. d. Cytoplasm.
3. Which of the following its increase leads to decreasing the vapor pressure of solutions
a. Number of solvent molecules. b. Temperature
c. Number of solute molecules. d. The amount of solution.
4. The colligative properties of solutions depend on
a. nature of solvent b. nature of solute
c. volume of solution d. number of solute particles
5. A body of mass 2 kg made of a material of specific heat $2 \times 10^3 \text{ J/kg} \cdot \text{K}$. If its temperature was 27°C , then it would absorb an amount of heat of 10^4 J , the temperature of the body
a. rises to 325 K b. rises to 325°C
c. increases by 2.5 K d. increases by 5 K
6. At what temperature does the mass of a sample of distilled water in (grams) equal the volume of the sample in (cm^3)?
a. 100°C b. 373 K c. 277 K d. 273°C
7. The density of pure water reaches its maximum value at
a. 0°C b. 4°C c. 100°C d. 104.5°C
8. The density of pure water at 4°C in SI (International system) units is
a. 1000 g/m^3 b. 1 g/cm^3 c. 1000 kg/m^3 d. 1000 kg/cm^3
9. On dissolving sodium bicarbonate salt in water, the solution becomes
a. acidic b. basic c. neutral d. amphoteric
10. As the number of plant leaves increases, the rate of transpiration
a. increases b. decreases c. vanishes d. isn't affected

11. Which of the following represents the largest source of water on the Earth's surface?

- a. Oceans.
- b. Fresh lakes.
- c. Groundwater.
- d. Glaciated rivers

12. Which of the following processes may be a direct source of groundwater?

- a. Water evaporation.
- b. Respiration in human.
- c. Transpiration in plants.
- d. Infiltration.

13. On dissolving ammonium chloride salt in water

- a. hydrolysis takes place and the solution becomes acidic
- b. hydrolysis takes place and the solution becomes basic
- c. the salt dissociates but no hydrolysis takes place
- d. the salt doesn't dissociate and no hydrolysis takes place

14. The solution at which the concentration of (H⁺) ions is less than the concentration of (OH⁻) ions is

- a. acidic solution and its pH value is less than 7
- b. acidic solution and its pH value is greater than 7
- c. basic solution and its pH value is less than 7
- d. basic solution and its pH value is greater than 7

15. A mass (m) of iron gained an amount of heat equal to (X)J and its temperature was raised from 20°C to 50°C. If a mass (m) of water gained the same amount of heat of (X) J, then its temperature would rise by

- a. 30°C
- b. greater than 30°C
- c. less than 30°C
- d. The answer can't be determined

16. Liquid starts to boil when its vapor pressure is

- a. less than pressure exerted on it
- b. equal to pressure exerted on it
- c. greater than pressure exerted on it.
- d. doubles the pressure exerted on it

17. At standard atmospheric pressure, if the boiling point of a pure solvent = X°C, the boiling point of solution formed that produced from dissolving one of its salts in it is

- a. equal to X °C
- b. greater than X °C
- c. less than X °C
- d. equal to $\frac{1}{2}$ X°C

18. What is the reason for the depression in the freezing point of an aqueous solution comparing to the freezing point of pure water?

- a. The attraction forces between the solute molecules and water molecules obstruct the freezing.
- b. Pure water contains a larger number of dissolved molecules.
- c. Dissolved salts in the solution reduce its osmotic pressure.
- d. Decreasing the vapor pressure of pure water.

19. Which of the following factors leads to slowing down the action of enzyme directly?

- a. Changing the pH value to its optimum for its action.
- b. Increasing the temperature greater than that is optimum for its action.
- c. Increasing the molecules of substrate.
- d. Increasing the enzyme's molecules.

20. When comparing between two equal concentrations of $\text{Al}_2(\text{SO}_4)_3$ and $\text{Al}(\text{NO}_3)_3$ solutions, the boiling point and vapor pressure of aluminum sulphate solution according to aluminum nitrate solution are and respectively.

- a. lower - higher
- b. higher - lower
- c. higher - higher
- d. lower - lower

21. The freezing point of a certain concentration from magnesium chloride solution (MgCl_2) is that of the same concentration from potassium nitrate solution (KNO_3).

- a. greater than
- b. less than
- c. equal to
- d. no correct answer

22. What happens to the vapor pressure of an aqueous solution when increasing the concentration of the solute?

- a. It decreases .
- b. It increases.
- c. It isn't affected.
- d. It vanishes.

23. What happens to vapor pressure of the liquid when its temperature increases?

- a. It increases.
- b. It decreases.
- c. It isn't affected.
- d. It vanishes.

24. When the melting glaciers enter the ocean water, they

- a. mix because each is a liquid water with the same density
- b. don't mix and the salty water floats on the surface of the fresh water
- c. don't mix and the fresh water floats on the surface of the salty water
- d. mix because they are two liquids with different density

25. Which pair of the following physical quantities have the same unit of measurement?

- a. Amount of heat and temperature.
- b. Specific heat and temperature.
- c. Amount of heat and internal energy.
- d. Internal energy and temperature .

26. When dissolving potassium bicarbonate salt in a suitable amount of distilled water, the pH value of the solution increases as a result of

- a. increasing the concentration of (H^+) ions
- b. increasing the concentration of (OH^-) ions
- c. decreasing the concentration of (OH^-) ions
- d. decreasing the concentration of each (H^+) and (OH^-) ions

27. Which of the following resulting from the dissolution of sodium bicarbonate in water?

- a. The concentration of (OH^-) ions decreases.
- b. The concentration of (H^+) ions increases.
- c. The pH value decreases.
- d. The pH value increases.

28. The reason for the polarity of the water molecule is the difference in

- a. electronegativity of its elements
- b. the atomic mass of its elements
- c. the number of covalent bonds between its atoms
- d. the type of covalent bonds between its atoms

29. What is the direct role of transpiration process in the hydrological cycle?

- a. Infiltration through sedimentary rocks .
- b. Condensation of water vapor forming clouds.
- c. Increasing CO_2 gas percentage in the atmosphere.
- d. Increasing the water vapor percentage in the atmosphere.

30. The ratio between (H^+) ions concentration in an acidic solution to their concentration in an alkaline solution is

- a. greater than 1
- b. equals 1
- c. less than 1
- d. equals 7

31. Which of the following sugar solutions has the highest boiling point?

- a. Solution of concentration 10 g/L
- b. Solution of concentration 5 g/L
- c. Solution of concentration 9 g/L
- d. Solution of concentration 1 g/L

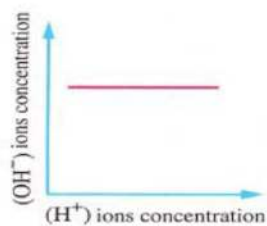
32. Assuming that a liquid boils at $90^\circ C$, if it is exposed to high pressure, its boiling point can be

- a. $82^\circ C$
- b. $90^\circ C$
- c. $110^\circ C$
- d. $70^\circ C$

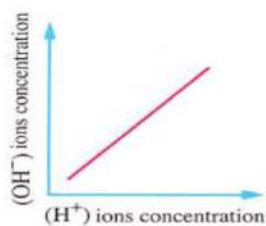
33. What is the effect of increasing the number of solute molecules in a certain volume of pure water on each of the freezing and boiling points respectively?

- a. Increases / Increases.
- b. Increases / Decreases.
- c. Decreases / Decreases.
- d. Decreases / Increases.

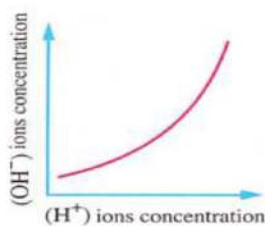
34. Which of the following graphs correctly expresses the relation between the concentration of each of (OH^-) and (H^+) ions with the continuous dissolution of excess ammonium chloride in water?



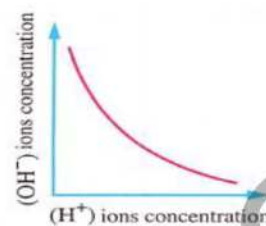
(a)



(b)



(c)



(d)

35. Which of the following has the highest osmotic pressure?

- a. Low-concentrated solution.
- b. High-concentrated solution.
- c. Pure liquid whose temperature is high.
- d. Pure liquid whose temperature is low.

36. Which of the following statements isn't applied to bacteria?

- a. They are prokaryotes.
- b. Their genetic material is surrounded by a nuclear membrane.
- c. Their cell walls contain peptidoglycan substance.
- d. They are unicellular organisms.

37. Glucose sugar is broken down inside the cell through a process called

- a. excretion
- b. digestion
- c. cellular respiration
- d. photosynthesis

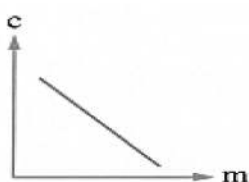
38. Which of the following are from the products of the glucose breakdown?

- a. CO_2 & O_2
- b. Water & CO_2
- c. O_2 & Energy.
- d. O_2 & Water.

39. If the amount of heat absorbed by a body doubles, its specific heat

- a. doubles
- b. halves
- c. remains constant
- d. becomes a quarter

40. Which of the following graphs represents the relation between the specific heat (c) of a certain metal and the mass (m) of several bodies of that metal?



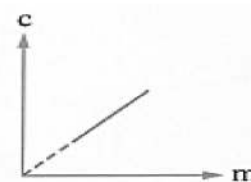
(a)



(b)



(c)



(d)

41. The temperature of a piece of aluminum of mass 0.3 kg has changed from 20°C to 253 K, given that the specific heat of aluminum is 900 J/kg.K, the piece of aluminum has

- a. absorbed an amount of heat of 10800 J b. absorbed an amount of heat of 62700.3 J
c. lost an amount of heat of 10800 J d. lost an amount of heat of 62700.3 J

42. The water cycle in nature is known as cycle.

- a. hydrogen b. geological c. biological d. hydrological

43. What is the process that occurs to the output of transpiration during the hydrological cycle?

- a. Evaporation. b. Infiltration. c. Falling. d. Condensation

44. Liquid at a specific temperature was poured into a cylindrical container until its level reached the middle of the container. The density of the liquid was (P), if more of the same liquid is poured at the same temperature to completely fill the container, the density of the liquid will be equal to

- a. $\frac{1}{2} P$ b. $2 P$ c. $\frac{3}{2} p$ d. p

45. If the temperature of an object is 220 K, then when the temperature of this object changes to - 3°C, the average kinetic energy of the molecules of that object

- a. increases b. decreases
c. doesn't change d. Can't be determined the answer

46. By increasing the number of ions of the non-volatile dissolved substances in water, all of the following is correct except

- a. the vapor pressure decreases b. the freezing point decreases
c. the osmotic pressure decreases d. the boiling point increases

47. Which of the following structures is usually located at the center of the animal cell?

- a. Nucleus. b. Vacuole. c. Mitochondria. d. Plastid.

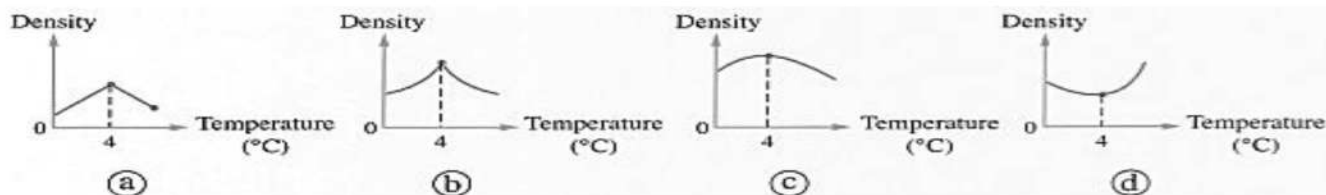
48. The percentage of water in blood plasma and other body fluids in mammals is about % of the body mass

- a. 23 b. 47 c. 70 d. 83

49. At higher altitudes above sea level, which of the following is correct about the boiling point of pure water?

- a. It decreases as the atmospheric pressure increases .
b. It decreases as the atmospheric pressure decreases.
c. It increases as the atmospheric pressure decreases .
d. It increases as the atmospheric pressure increases.

50. Which of the following graphs represents the change in the density of pure water with temperature?



51. What is the mass of hydrogen in a sample of distilled water whose mass is 200 g?

- a. 11.11 g b. 22.22 g c. 88.89 g d. 177.78 g

52. The value of the angle between the two bonds in the water molecule is

- a. 10.45° b. 104.5° c. 105.4° d. 10.54°

53. Water polarity causes

- a. the dissolution of many substances in it b. decreasing its density
c. its acidic effect d. its basic effect

54. What is the type of bonds among water molecules?

- a. Hydrogen bonds. b. Single covalent bonds.
c. Ionic bonds. d. Double covalent bonds.

55. What happens to the molecules of pure water when its temperature decreases from 4°C to 0°C ?

- a. They get closer to each other. b. They get away from each other.
c. They remain consistent in their positions. d. Their volumes decrease.

56. Which of the following structures has a transport function inside the living cell ?

- a. Endoplasmic reticulum. b. Mitochondria.
c. Chloroplast. d. Sap vacuole.

57. Which of the following organelles has a storage function inside the living cell?

- a. Chloroplast. b. Endoplasmic reticulum.
c. Mitochondria. d. Vacuole.

58. The probability of water molecules evaporation in solutions decreases compared to pure water due to

- a. increasing the attraction forces among water molecules
b. decreasing the attraction forces among water molecules
c. the presence of attraction forces between water and solute molecules
d. the absence of attraction forces between water and solute molecules

59. Which of the following processes is opposite to the condensation process in the water cycle in nature?

- a. Water infiltration through the soil pores.
- b. Evaporation from water bodies.
- c. Rain falling.
- d. Ice melting.

60. When comparing the boiling point of H_2O with the boiling point of H_2S

- a. H_2O is higher, as its molecules are bound by hydrogen bonds
- b. H_2S is higher, as its molecules are bound by hydrogen bonds
- c. H_2O is higher due to its small molecular mass
- d. H_2S is higher due to its great molecular mass

61. Which of the following is from the chloroplasts functions in the plant cell?

- a. Performing photosynthesis process.
- b. Transport inside the cell.
- c. The breakdown of glucose and energy production.
- d. Water storage.

62. The percentage of water inside the mammal cells is about% of the organism's body mass.

- a. 23
- b. 47
- c. 60
- d. 80

63. Which of the following directly participate(s) in all the metabolic processes?

- a. Mineral salts.
- b. Water.
- c. Carbohydrates.
- d. Lipids.

64. On heating a sample of pure water till boiling

- a. the covalent bonds are broken and water molecules are released in the form of water vapor
- b. the covalent bonds are broken and hydrogen atoms are separated from oxygen atoms
- c. the hydrogen bonds are broken and water molecules are released in the form of water vapor
- d. the hydrogen bonds are broken and hydrogen atoms are separated from oxygen atoms

65. The patient who suffers from severe stomach acid secretion (stomach acid reflux) is advised to

- a. use a suitable treatment that decreases the pH value
- b. use a suitable treatment that increases the pH value
- c. eat food that increases the (H^+) ions concentration
- d. drink soda that contains percentage of CO_2

66. If the boiling point of a solution at a mountaintop is $108^\circ C$, therefore the boiling point of the same solution on the Earth's surface is

- a. $106^\circ C$
- b. $104^\circ C$
- c. $108^\circ C$
- d. $110^\circ C$

67.The solution is characterized from pure solvent by

- a. having low vapor pressure
- b. the absence of osmotic pressure
- c. the depression in the boiling point
- d. the elevation of the freezing point

68.If the boiling point of acetic acid at 1 atm pressure equals 118°C, it is expected that its boiling point at 0.8 atm pressure equals

- a. 111°C
- b. 118°C
- c. 119°C
- d. 125°C

69.All the following are from vertebrates, except

- a. fish
- b. amphibians
- c. reptiles
- d. arthropods

70.Which of the following structures exist(s) in all living cells?

- a. Cell wall.
- b. Plasma membrane.
- c. Nuclear membrane.
- d. Chloroplasts.

71.Which of the following doesn't belong to eukaryotes?

- a. Corn plant.
- b. Sponge.
- c. Jellyfish.
- d. Bacteria.

72.Which of the following are found in both of a human skin cell and a cell of a corn plant leaf?

- a. Nucleus and cytoplasm.
- b. Plasma membrane and large vacuole.
- c. Nucleus and plastid.
- d. Plasma membrane and cell wall.

73.Which of the following is from the colligative properties of solutions?

- a. Elevation of vapor pressure.
- b. Depression of boiling point.
- c. Elevation of freezing point.
- d. Osmotic pressure.

74.What is the effect of increasing the number of solute molecules in solution on the boiling point of the solution and its osmotic pressure respectively?

- a. Increases, Increases.
- b. Decreases, Decreases.
- c. Increases, Decreases.
- d. Decreases, Increases.

75.If the freezing point of a pure solvent is 0°C, what will be the freezing point if 5g of salt is dissolved in it?

- a. Less than 0°C
- b. Equals 0°C
- c. Higher than 0°C
- d. 0°C: 4°C

76.When the temperature of pure water increases from 4 °C to 8°C, what happens to the volume and the density of water respectively?

- a. Increases, Increases.
- b. Decreases, Increases.
- c. Increases, Decreases.
- d. Decreases, Decreases.

77.At normal atmospheric pressure, the boiling point of pure water (H₂O) is greater than that of hydrogen sulphide (H₂S) by

- a. 100°
- b. -61 °c
- c. 39°c
- d. 161°c

✱(2) Give reasons for each of the following :

1. Condensation has an important role in the water cycle in nature.
.....
2. Water is a polar compound.
.....
3. The elevation of the boiling point of pure water, although it is a covalent compound.
.....
4. The solution that is produced from the dissolution of sodium bicarbonate salt in water is alkaline.
.....
5. The solution that is produced from the dissolution of ammonium chloride salt in water is acidic.
.....
6. Density has a unit of measurement, while relative density has no unit of measurement.
.....
7. The freezing of lake water in polar regions begins at the surface rather than the bottom.
.....
8. Fish live without freezing in frozen lakes or rivers.
.....
9. Water has a high specific heat compared to other liquids.
.....
10. Water is used as a coolant in car engines and factories.
.....
11. The vapor pressure of the solution is always lower than the vapor pressure of the pure solvent forming it.
.....
12. The boiling point of the aqueous solution is higher than the boiling point of pure water at the standard atmospheric pressure.
.....
13. Large amounts of salt are spread on roads in cold countries at rainfall.
.....
14. The freezing point of the aqueous solution is always less than the freezing point of pure water.
.....

15. Bacteria belong to prokaryotes.

.....

16. Protozoa belong to eukaryotes.

.....

17. Nucleus controls the living cell activities.

.....

18. Cytoplasm has an important role in the survival of the living cell.

.....

19. Chloroplasts have an important role in performing the photosynthesis process.

.....

20. Enzymes are similar with chemical catalysts.

.....

✱(3) What happens in each of the following cases:

1. Dissolution of ammonium bicarbonate salt in water "regarding: the concentration of (H^+) and (OH^-) ions".
.....
2. Dissolution of sodium bicarbonate salt in water "regarding: the pH" value.
.....
3. Dissolution of ammonium chloride salt in water "regarding: the pH" value.
.....
4. The evaporation rate equals the condensation rate.
.....
5. The vapor pressure of pure liquid equals the vapor pressure exerted on its surface.
.....
6. The absence of chloroplasts in the cells of bean plant.
.....
7. The absence of plasma membrane in the living cell.
.....
8. The absence of enzymes in living cells.
.....
9. The increase of temperature above the optimal temperature for the enzyme's action.
.....

✳(4) Problem:

1 Compare between: Boiling point of pure water when measured at mountaintop and inside a pressure cooking pot. With explanation.

.....

.....

.....

2 A piece of aluminum its temperature is 30°C gained amount of heat of 500 J, so its temperature rose to 310 K. Calculate the mass of aluminum piece.

(Given that: the specific heat of aluminum is 900 J/kg.K).

.....

.....

.....

3 If you have two liquids (X) and (Y), liquid (X) evaporates faster than liquid (Y) at 30°C :

(a) Which of the two liquids has the highest vapor pressure at 30°C ?

(b) Which of the two liquids has the highest boiling point?

.....

.....

.....

4 Mention the factors affecting each of: The density of the pure substance.

.....

.....

5 Mention the factors affecting each of: The amount of heat lost or gained by a substance when its temperature changes.

From the relation: $Q_{th} = mc\Delta t$

6 How can you increase the density of water that was at room temperature in two methods?

7 If the relative density of aluminum is 2.7 and the density of water at 4 °C is 10^3 kg/m^3 , calculate the density of aluminum.

8 A copper piece of mass 0.3 kg had temperature of 20°C. If it absorbed an amount of heat of 5850 J, calculate its final temperature.

(Given that: the specific heat of copper is 390 J/kg.K).

Model Answer

*(2) Choose the correct answer:

1. c	11. a	21. b	31. a	41. c	51. b	61. a	71. d
2. d	12. d	22. a	32. c	42. d	52. b	62. b	72. a
3. c	13. a	23. a	33. d	43. d	53. a	63. b	73. d
4. d	14. d	24. c	34. d	44. d	54. a	64. c	74. a
5. c	15. c	25. c	35. b	45. a	55. b	65. b	75. a
6. c	16. b	26. b	36. b	46. c	56. a	66. d	76. c
7. b	17. b	27. d	37. c	47. a	57. d	67. a	77. d
8. c	18. a	28. a	38. b	48. a	58. c	68. a	
9. b	19. b	29. d	39. c	49. b	59. b	69. d	
10. a	20. b	30. a	40. c	50. c	60. a	70. b	

*(2) Give reasons for each of the following :

- As condensation participates in formation of clouds.
- As the oxygen atom is characterized by being more electronegative than hydrogen atom. So, the electrons of covalent bond are attracted towards the oxygen atom forming a partial negative charge on the oxygen atom and a partial positive charge on the hydrogen atom.
- Due to the presence of hydrogen bonds among water molecules, which causes its presence in a liquid state and having a high boiling point, while no hydrogen bonds are present among hydrogen sulphide molecules, which causes its presence in gaseous state.
- As on dissolving sodium bicarbonate salt in water, hydrolysis takes place and it leads to decreasing the concentration of hydrogen ions (H^+) and increasing the concentration of hydroxide ions (OH^-), which makes the solution alkaline.
- As on dissolving ammonium chloride salt in water, hydrolysis takes place and it leads to decreasing the concentration of hydroxide ions (OH^-), and increasing the concentration of hydrogen ions (H^+) which makes the solution acidic.
- Because density is ratio between two different quantities , while relative density is a ratio between two quantities that have the same unit of measurement.
- *Because when the temperature of surface water drops from $4^\circ C$ to $0^\circ C$, the water of the surface expands and becomes less dense than the layers below it, so the cold surface water layer remains floating above the warmer layers of water.
*As the temperature continues to drop, the surface layer freezes and the ice remains floating on the surface because its density is less than the density of the layers below it.
- Because the surface layer of ice acts as a thermal insulator for the water below it, so the water close to the bottom remains at $4^\circ C$.
- Because there are strong hydrogen bonds between the water molecules that require a large amount of energy to break them.
- Because the specific heat of water is high making it absorb (gain) a large amount of heat without a significant change in its temperature.
- Because the number of molecules subjected to evaporation from the surface of the solution is lower, because some solute molecules or ions occupy a part of the liquid surface, as the energy required to overcome the attraction forces among water molecules and solute molecules or ions increases . Therefore the number of molecules that can be subjected to evaporation decreases and the solution vapor pressure decreases .
- As the solution vapor pressure decreases than the vapor pressure of pure water, due to the presence of attraction forces between the solvent (water) and solute molecules or ions, which lead to increasing the required energy to evaporate the liquid.

13. To prevent the freezing of rainwater on roads, prevent car from skidding and reduces accidents.
14. Because the attraction forces between water molecules and solute molecules or ions obstruct the binding of water molecules together to form ice crystals.
15. Because they are living organisms whose cytoplasm contains a genetic material that isn't surrounded by a nuclear membrane.
16. Because they are living organisms whose cytoplasm contains a genetic material surrounded by a nuclear membrane.
17. Because the nucleus contains the genetic material.
18. Because the cytoplasm contains some important chemical substances for the survival of the living cell.
19. Because they contain chlorophyll substance.
20. Because it allows the biochemical reactions to occur through dissolving the mineral salts and nutrients , carrying the gases as oxygen and carbon dioxide to facilitate their transport inside the living organism and getting rid of wastes outside the living organism.

✱(3) What happens in each of the following cases:

1. The concentration of (H^+) ions remains equal to the concentration of (OH^-) ions.
2. An alkaline solution will be formed and its pH value is greater than 7
3. An acidic solution will be formed and its pH value is less than 7
4. A dynamic equilibrium occurs between the liquid and its vapor.
5. The liquid starts to boil.
6. They can't perform photosynthesis process required for producing food.
7. The living cell can't protect its internal components and has no ability to regulate the passage of substances from and to the cell.
8. The cell will need to a high activation energy to start the chemical reaction required for its survival, in addition to the slowdown of these reactions or their stop in case of the absence of enzymes.
9. The enzyme's activity will gradually decrease till it stops completely.

★(4) Problem:

1	* Boiling point of pure water at the mountaintop: Less than 100°C, due to decreasing the pressure exerted on the liquid surface. * Boiling point of pure water inside a pressure cooking pot: Greater than 100°C, due to increasing the pressure exerted on the liquid surface.	2	$t_2 = T_2 - 273 = 310 - 273 = 37^\circ\text{C}$ $Q_{th} = mc\Delta t$ $m = \frac{Q_{th}}{c \Delta t} = \frac{500}{900 \times (37 - 30)} = 0.08 \text{ kg} = 80 \text{ g}$
3	(a) Liquid (X). (b) Liquid (Y).	4	(a) The density of a pure substance depends on: • The mass of the molecules. • The intermolecular spaces.
5	The factors that affect the amount of heat lost or gained by the substance are: 1. Mass of the body (Direct relation). 2. The specific heat for the body substance (Direct relation) . 3. The required change in the temperature of the body (Direct relation).	6	Increasing the density of water can be done by: • Decreasing the temperature of water till a degree greater than or equal to 4°C at which the density of water becomes maximum. • Dissolving an amount of salt to water.
7	$\rho_{\text{Aluminum}} = \rho_{\text{water}} \times \rho_{\text{relative}}$ $= 10^3 \times 2.7 = 2700 \text{ kg/m}^3$	8	$Q_{th} = mc\Delta t = mc (t_2 - t_1)$ $5850 = 0.3 \times 390 \times (t_2 - 20)$ $t_2 - 20 = 50 \quad , \quad t_2 = 70^\circ\text{C}$

حمل الآن

مجاناً وحصرياً

المراجعة رقم (4)

اختبار شهر اكتوبر



1st Secondary

Integrated Sciences

الفصل الدراسي الأول

الدرس - الأول -

The Hydrosphere of Planet Earth

- الإختبار -

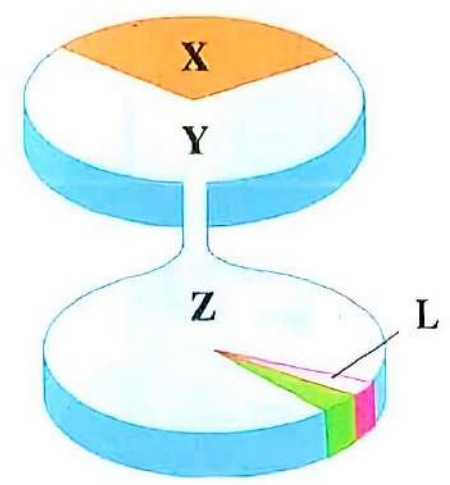
I - Choose the correct answer :

1. What are the states of matter at which water exists in the spheres of planet Earth?.....
- a. O Solid and liquid

b. O Solid and gaseous

c. O Solid, liquid and gaseous

d. O Liquid and gaseous
2. The opposite figure shows the distribution of water on the Earth's surface.



Which of the following choices in the table is correct?.....

	X	Y	Z	L
a. O	Land	Ice	Fresh water	Saltwater
b. O	Land	Ice	Saltwater	Fresh water
c. O	Fresh water	Ice	Saltwater	Land
d. O	Land	Water	Saltwater	Fresh water

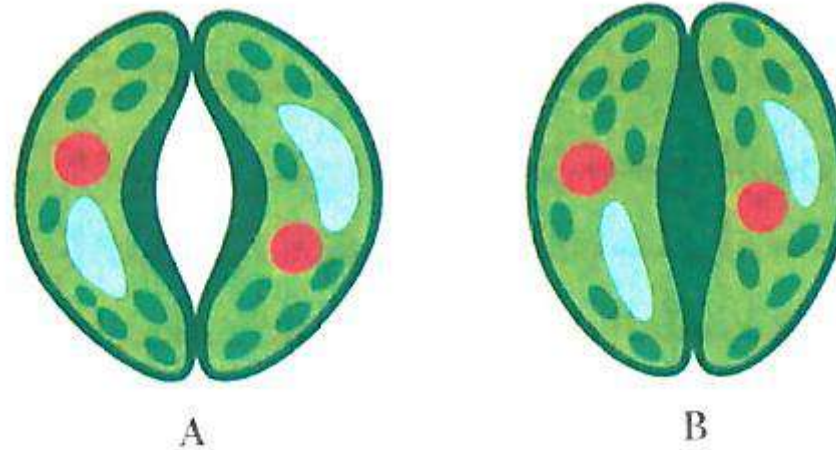
3. In which physical states does water appear as part of the components of the atmosphere?.....
- a. O Liquid only

b. O Solid and liquid

c. O Liquid and gaseous

d. O Gaseous only

4. Which of the following processes doesn't lead to increasing the percentage of water vapor in the atmosphere?..
- Transpiration in plants
 - Water infiltration through sedimentary rocks
 - Animals respiration
 - Seawater evaporation
5. Which of the following processes is opposite to the condensation process in the water cycle in nature?....
- Water infiltration (leakage) through the soil pores
 - Evaporation from water surfaces
 - Rain falling
 - Ice melting
6. What is the direct role of transpiration process in the hydrologic cycle?.....
- Water leakage through sedimentary rocks
 - Condensation of water vapor forming clouds
 - Increasing CO₂ gas percentage in the atmosphere
 - Increasing the water vapor in the atmosphere
7. The two processes in which the physical state of water is the same after their occurrence directly are...
- evaporation and condensation
 - transpiration and evaporation
 - condensation and transpiration
 - condensation and freezing
8. Study the opposite figure, which shows two cases of microscopic stomata. Identify:
Which of the two cases causes the ascending of water and salts from the roots to the upper parts of the plant?..



- (A) only
- (B) only
- (A) and (B)
- None of them

1st Secondary

Integrated Sciences

الفصل الدراسي الأول

الدرس - الثاني -

The Chemical Properties of water

- الإختبار -

First : Choose the correct answer :

1. Which of them expresses the unique properties of water?.....

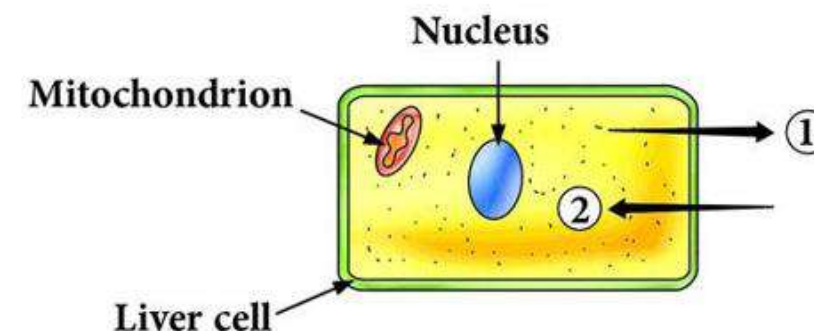
- a. Water has the ability to dissolve many chemical substances
- b. Water always exists in liquid form at the known temperatures on the Earth's surface
- c. Water passes through the plasma membrane of all cell of living organisms

- a. O (a) and (c)
- b. O (a) and (b)
- c. O (a), (b) and (c)
- d. O (b) and (c)

2. The opposite diagram represents the structure of a living cell. Study it well, then answer

What is the main purpose of the passage of water in direction (2)?.....

- a. O Transport of nutrients and oxygen
- b. O Removal of wastes
- c. O Regulation of temperature
- d. O Transport of carbon dioxide gas



3. In the opposite water molecule :

(Given that the atomic mass of H = 1, O = 16)



The mass percentage of hydrogen is.....%

- a. O $\frac{100}{3}$
- b. O $\frac{200}{3}$
- c. O $\frac{100}{9}$
- d. O $\frac{200}{9}$

4. A pure sample of water contains 0.37 g of hydrogen. The total mass of the sample equals

- a. O 3.33 g b. O 2.96 g c. O 8.89 g d. O 1.1 g

5. To form 54 gm of water, it is required to react to 48 gm of oxygen with 6 gm of hydrogen.

So, 2 gm of hydrogen combines completely with.....gm of oxygen

- a. O 12 b. O 16 c. O 96 d. O 144

6. A sample of water contains oxygen with a mass percentage of 90%. This sample is.....

- a. O Pure, with hydrogen mass percentage of 10% c. O Impure, containing non—exogenous impurities
b. O Impure, containing exogenous impurities d. O Pure, with hydrogen mass percentage of 11.11 %

7. Which of the following isn't from the properties of water that support the life?.....

- a. O Dissolving many chemical compounds c. O Passing required substances to inside the cell
b. O The difference in the mass of its elements d. O Passing the wastes to outside the cell

8. A covalent bond is a type of.....bonds in which two atoms share a(an).....number of electrons.

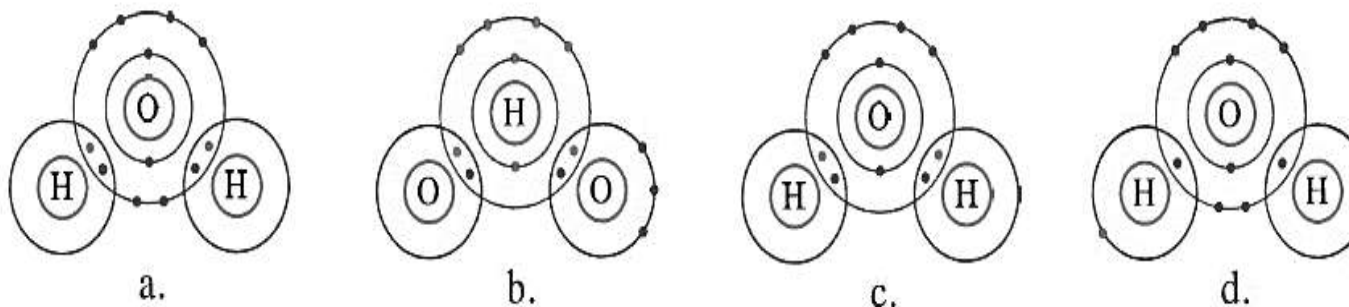
Which of the following is correct?

- a. O Chemical – equal c. O Physical – equal
b. O Chemical – unequal d. O Physical – unequal

9. How many covalent bonds are present inside three water molecules?.....

- a. O 3bonds b. O 9bonds c. O 6 bonds d. O 12 bonds

10. Which of the following figures represents the water molecule? Fig.....



11. **What is the reason of forming hydrogen bonds among water molecules?.....**

- a. O Volume of (O) atom > Volume of (H) atom
- b. O Mass of (O) atom > Mass of (H) atom
- c. O Density of (O) atom > Density of (H) atom
- d. O Electronegativity of (O) atom > Electronegativity of (H) atom

12. **A pure water sample contains.....bonds**

- a. O Polar covalent bonds causing low boiling point
- b. O Polar covalent bonds with bond angles > 90°
- c. O Hydrogen bonds causing low boiling point
- d. O Hydrogen bonds reducing cohesion

13. **The diagram shows the structure of a water molecule**

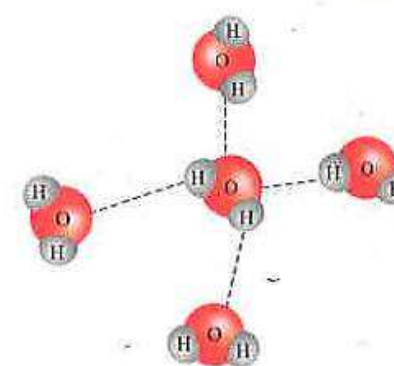
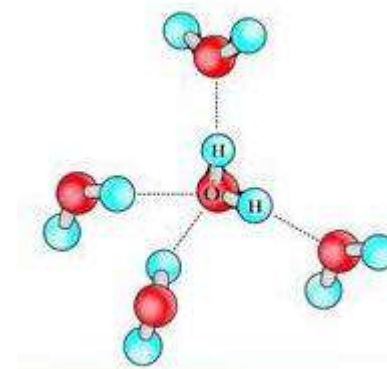
The angles between bonds in water molecule equals.....

- a. O 104.5°
- b. O 120°
- c. O 105.4°
- d. O 100°

14. **The opposite figure represents a number of water molecules.**

What is the number of hydrogen and covalent bonds respectively?.....

- a. O 4/10
- b. O 5/4
- c. O 4/5
- d. O 10/4



15. **How many hydrogen atoms enter in the formation of 6 hydrogen bonds among a number of water molecules?.**

- a. O 6
- b. O 12
- c. O 18
- d. O 24

16. All of the following are results of the polarity of the water molecule, except.....

- a. ☐ The bonding of water molecules together by hydrogen bonds
- b. ☐ The ability to dissolve many mineral salts
- c. ☐ The boiling point of water rises to 100 °C
- d. ☐ The ability to dissolve a non-polar organic compound

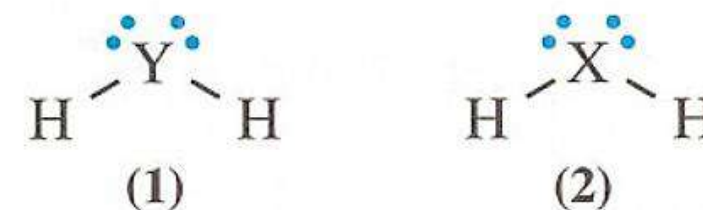
17. Which of the following explains why water has a higher boiling point compared to hydrogen sulphide (H₂S), despite the similarity in their molecular structures?....

- a. ☐ Covalent bonds in water are weaker than that in H₂S
- b. ☐ Water Hydrogen bonds are stronger than that in H₂S
- c. ☐ Water is non-polar while H₂S is polar
- d. ☐ Oxygen is more electronegative than sulphur

18. The following figure shows the molecular structure of two compounds, as hydrogen bonds are found among the molecules of compound (1), while being absent among the molecules of compound (2) despite of their similar structures.

What is the reason for that?.....

- a. ☐ The difference in the electronegativity between atoms (X) and (H) is higher
- b. ☐ The difference in the electronegativity between atoms (Y) and (H) is higher
- c. ☐ Molecule (1) is non-polar, while molecule (2) is polar
- d. ☐ The electronegativity of atom (X) is higher than that of atom (Y)



19. Which of the following explains the ability of water to dissolve most salts and break them into hydrated ions?

- a. ☐ Presence of ionic bonds
- b. ☐ Presence of covalent bonds
- c. ☐ Water polarity
- d. ☐ Small bond angles

1st Secondary

Integrated Sciences

الفصل الدراسي الأول

الدرس - الثالث -

The Physical Properties of Water

- الإختبار -

First : Choose the correct answer :

1. One of the units of density measurement is.....

- a. O N.m^{-3} b. O g.mm^{-1} c. O Kg.cm^{-1} d. O g.L^{-1}

2. The density of 12 gm of pure iron is.....the density of 2 gm of it

- a. O more than b. O less than c. O equal to d. O double

3. The mass of a piece of rock whose density is 2.8 gm/cm^3 is 28 gm so, the density of 280 gm of it is..... gm/cm^3

- a. O 280 b. O 28 c. O 2.8 d. O 28.5

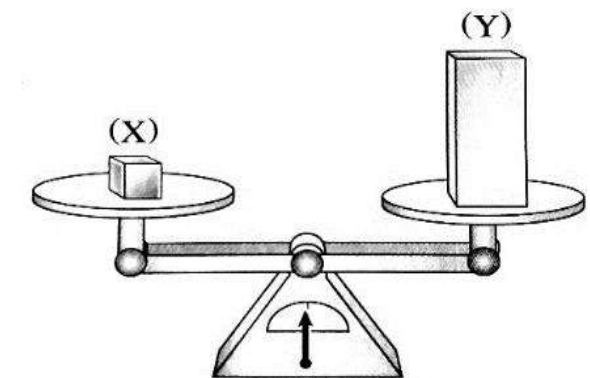
4. Two objects (A) and (B) are equal in mass, if the density of the substance of object (A) is doubled the density of the substance of object (B), so the ratio between the volume of object (A) to the volume of object (B) is...

- a. O 1 : 1 b. O 1 : 2 c. O 2 : 1 d. O 2 : 2

5. In the opposite figure :

The two objects (X) and (Y) have the same.....

- a. $\text{O volume and density}$
b. O mass and volume
c. $\text{O mass and density}$
d. $\text{O mass and they are from different substances}$



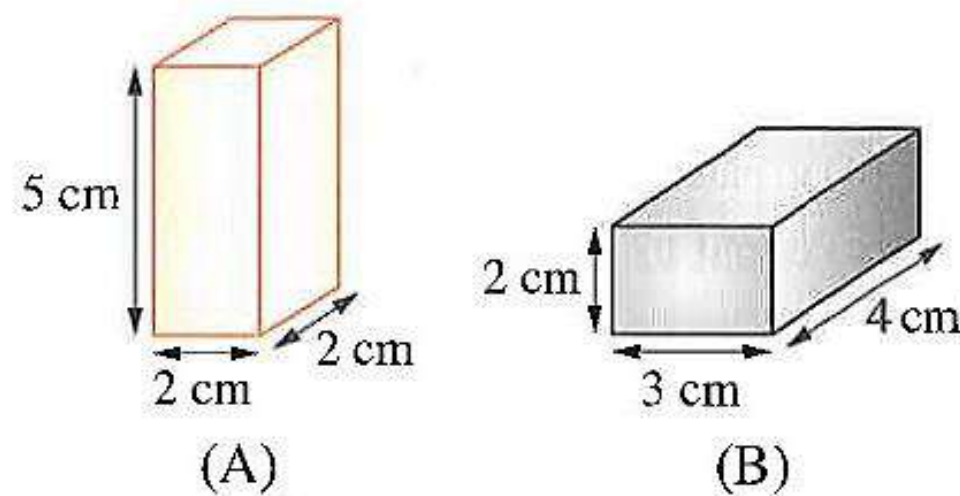
6. A flask containing a sample of seawater was placed on the pan of a balance.

The reading of the balance for the water and the flask together was 100 g, as shown in the figure. Knowing that the density of seawater is 1030 kg/m^3 , what do you expect the volume of the sample to be?....

- a. $\text{O Greater than 97 cm}$ c. O Equal to 97 cm
b. O Less than 97 cm d. $\text{O Cannot be determined}$



7. The opposite figure shows the dimensions of two solid bodies, A and B, having the same mass, so which body is made of the material of the higher density?.....



- a. ☐ Body A
b. ☐ Body B
c. ☐ Both bodies have the same material density
d. ☐ The answer cannot be determined
5. The mass of water in gm is always.....its volume is cm^3 (knowing that the density of water is $1 \text{ gm}/\text{cm}^3$)
a. ☐ double
b. ☐ less than
c. ☐ more than
d. ☐ equal to
8. The mass of a piece of ice before melting is.....its mass after melting
a. ☐ more than
b. ☐ less than
c. ☐ equal to
d. ☐ (a) and (b)
9. A quantity of pure water of temperature 3°C is placed in a refrigerator.

What happens to the mass and volume of the water when it freezes?.....

	Water mass	Water volume
a. ☐	Increases	Increases
b. ☐	Doesn't change	Increases
c. ☐	Decreases	Increases
d. ☐	Doesn't change	Decreases

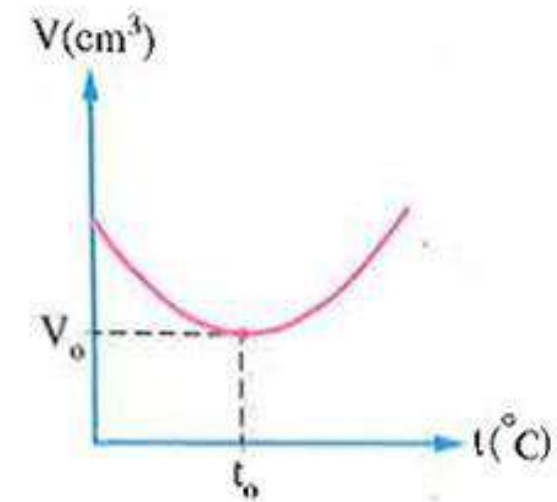
10. The opposite graph represents the relation between the volume (V) of a quantity of pure water of mass 2 g and its temperature (t), so :

1. The value of (t_0) on the graph equals.....

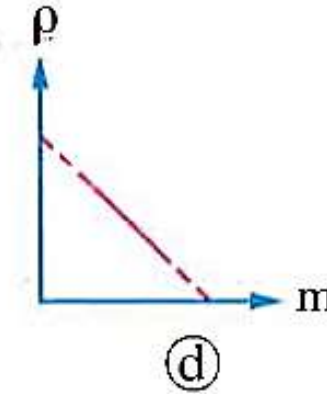
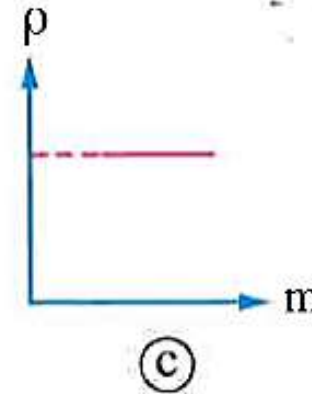
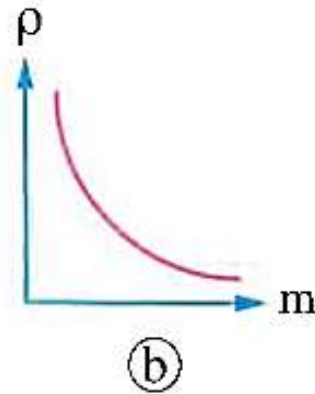
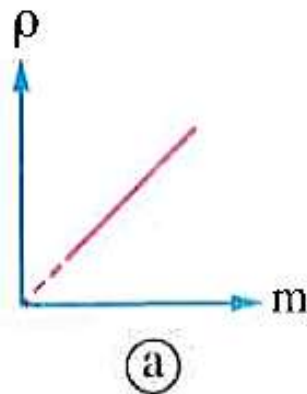
- a. 0 2 °C
- b. 0 4 °C
- c. 0 8 °C
- d. 0 10 °C

2. The value of (V_0) on the graph equals.....

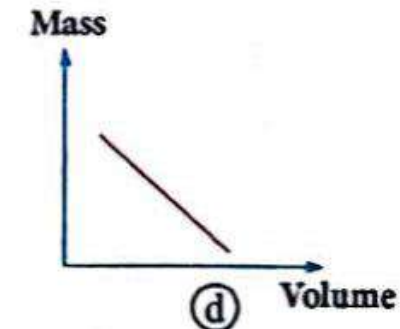
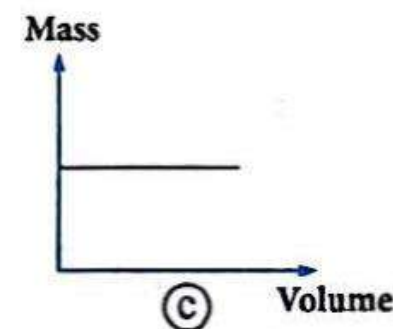
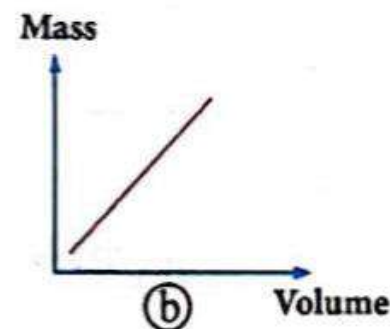
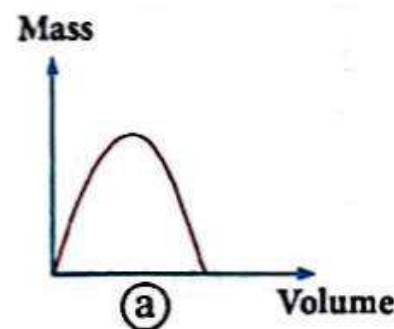
- a. 0 0.99 cm³
- b. 0 1 cm³
- c. 0 1.9 cm³
- d. 0 2 cm³



11. The graph that represents the relationship between density (ρ) of pure water and mass (m) of samples from it at a temperature of 50°C is

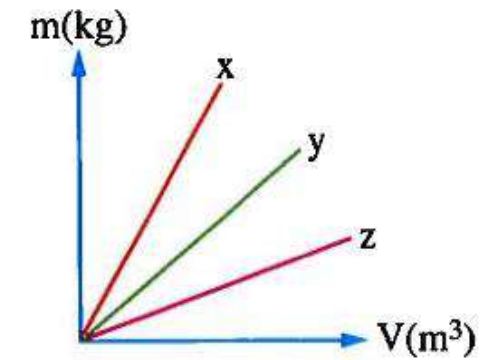


12. Which of the following graphs represents the relation between the mass of a liquid and its volume, assuming constant temperature?.....

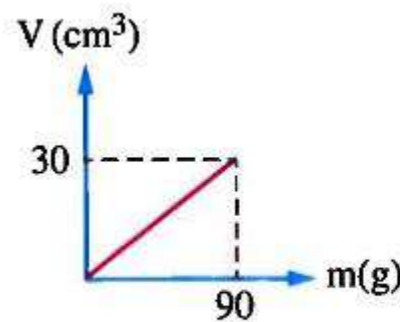


13. The opposite graph represents the relation between the mass (m) and the volume (V) for different samples that are taken from three liquids. (x), (y) and (z), so the correct order for the density of the three liquids is .

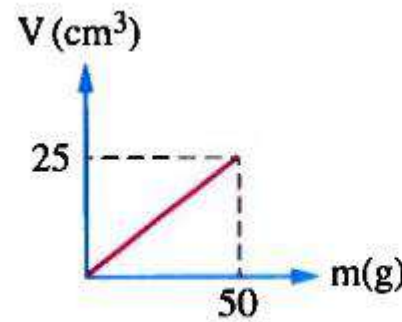
- a. $\rho_x < \rho_y < \rho_z$
- b. $\rho_x = \rho_y = \rho_z$
- c. $\rho_x > \rho_y > \rho_z$
- d. $\rho_x < \rho_y > \rho_z$



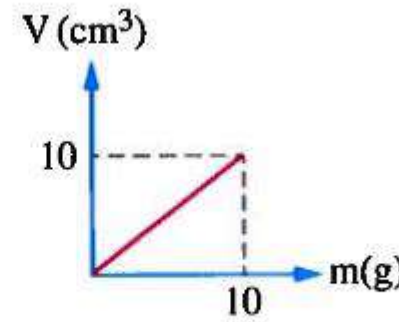
14. Which of the following graphs represents the relation between the volume (V) in cm^3 and the mass (m) in grams for samples of pure water of density equals 1000 kg/m^3 ?.....



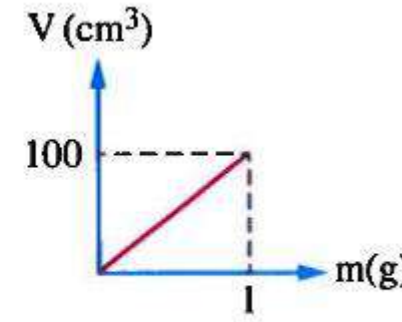
(a)



(b)



(c)



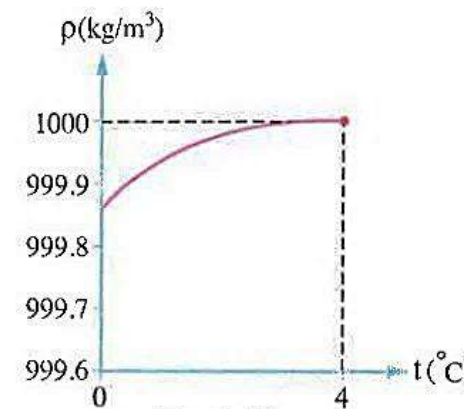
(d)

15. Graph (1) shows the relation between density (ρ) of pure water and its temperature (t) on the Celsius scale.

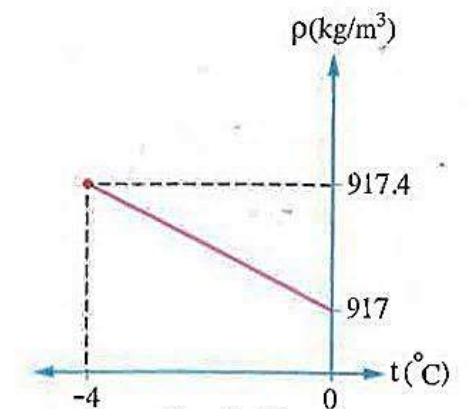
Graph (2) represents the same relationship for ice.

By studying the two graphs, the density of ice at 0°C is.....

- a. ρ equal to the density of liquid water at 0°C
- b. ρ greater than the density of liquid water at 0°C
- c. ρ less than the density of liquid water at 0°C
- d. ρ indeterminable

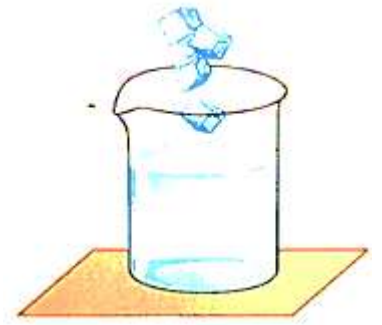


Graph (1)



Graph (2)

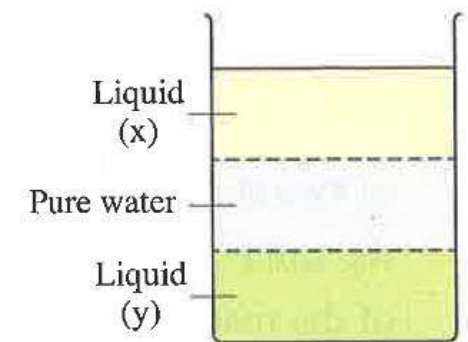
16. Ice cubes formed from pure water are added to a container of pure water at 4°C , as shown in the opposite figure. What happens to the density of the water during the melting of ice?.....



- a. ☐ Increases
 - b. ☐ Decreases
 - c. ☐ Remains unchanged
 - d. ☐ Cannot be determined
17. Liquid at a specific temperature was poured into a cylindrical container until its level reached the middle of the container. The density of the liquid was (ρ), if more of the same liquid is poured at the same temperature to completely fill the container, the density of the liquid will be equal to.....

- a. ☐ $\frac{1}{2} \rho$
 - b. ☐ 2ρ
 - c. ☐ $\frac{3}{2} \rho$
 - d. ☐ ρ
18. The opposite figure shows three immiscible liquids in one container. So, the ratio between the density of liquid (x) and that of liquid (y) is.....

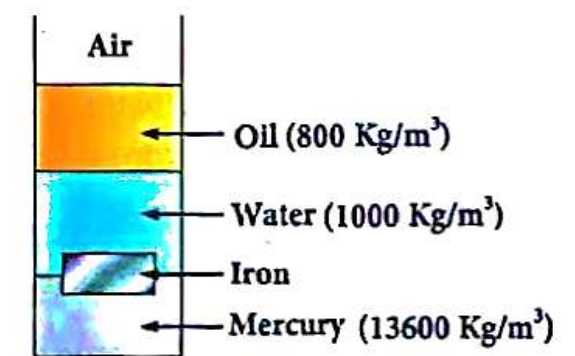
- a. ☐ more than 1
- b. ☐ less than 1
- c. ☐ equal to 1
- d. ☐ indeterminable



19. The opposite figure shows several immiscible liquids of known density that are settled inside a container, when a piece of iron was dropped into the container, it suspended as shown in the figure

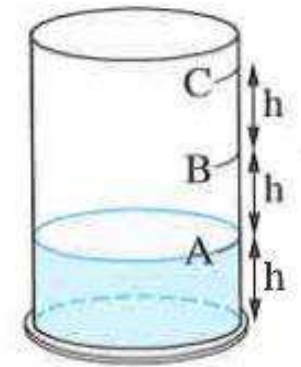
The density of iron can be.....(Kg/m^3)

- a. ☐ 600
- b. ☐ 8000
- c. ☐ 1000
- d. ☐ 14000



20. The opposite figure shows a container with an amount of liquid (X) of relative density (2) with a mass (m). If an amount of liquid (Y) with a mass (m) of relative density (1) is added to the container and does not mix with the first liquid

The surface level of liquid Y will settle.....

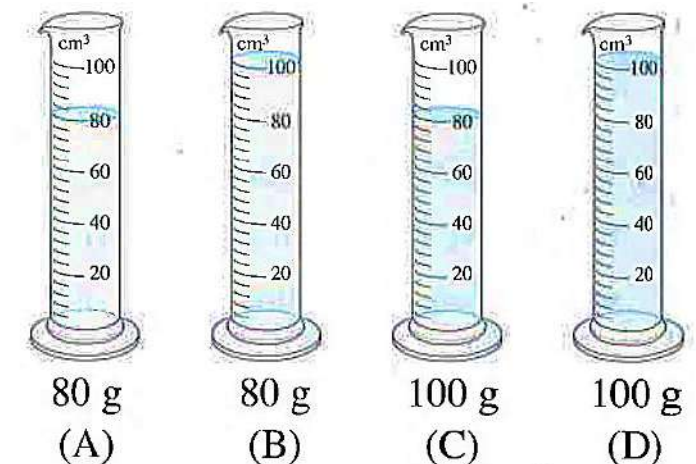


- a. O at level B
 - b. O between levels A and B
 - c. O at level C
 - d. O between levels B and C
21. The candle floats on the surface of water, while it sinks in alcohol. This is explained by.....
- a. O The candle has a greater mass in alcohol
 - b. O The mass of water is less than the mass of alcohol
 - c. O The density of water is greater than the density of alcohol
 - d. O All of the above are possible

22. The opposite figure shows four graduated cylinders A, B, C and D, each containing a liquid where the mass of each liquid is shown below its cylinder.

All the cylinders are in the same room at a temperature of 25°C , so the two cylinders that contain the same liquid are.....

- a. O A and D
- b. O A and C
- c. O B and C
- d. O B and D



23. The lead balls in the hydrometer :.....
- a. O is the reason for the immersed part of the hydrometer
 - b. O react with the substance to be measured
 - c. O balance with temperature of the liquid
 - d. O helps floating of the hydrometer

1st Secondary

Integrated Sciences

الفصل الدراسي الأول

الدرس - الرابع -

Properties of Aqueous Solutions

- الإختبار -

First : Choose the correct answer :

1. **The aquatic environment for marine organisms is.....**

- a. ☐ homogeneous mixture, in which water is the solvent
- b. ☐ A heterogeneous mixture, in which water is the solvent
- c. ☐ homogeneous mixture, in which water is the solute
- d. ☐ A heterogeneous mixture, in which water is the solute

2. **Which of the following properties is not considered a colligative property of water?..**

- a. ☐ Vapor pressure of the liquid
- b. ☐ Osmotic pressure
- c. ☐ Boiling point
- d. ☐ Specific heat capacity

3. **When does the liquid reach the dynamic equilibrium state?.....**

- a. ☐ When the evaporation rate is higher than the condensation rate
- b. ☐ When the evaporation rate is equal to the condensation rate
- c. ☐ When the condensation rate is greater than the evaporation rate
- d. ☐ When evaporation continues and condensation vanishes

4. **What happens to vapor pressure of the liquid when its temperature increases?.....**

- a. ☐ Increases
- b. ☐ Decreases
- c. ☐ Not affected
- d. ☐ Becomes zero

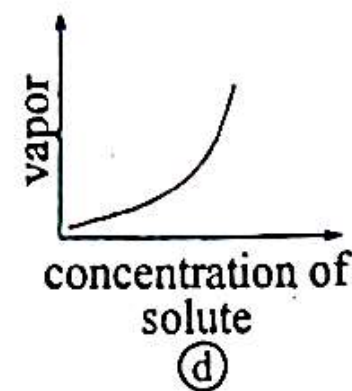
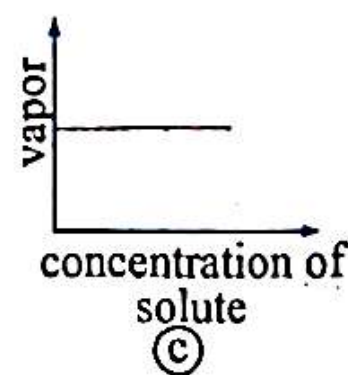
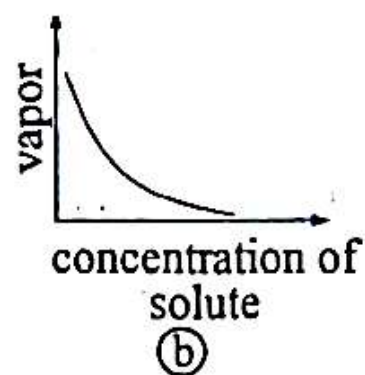
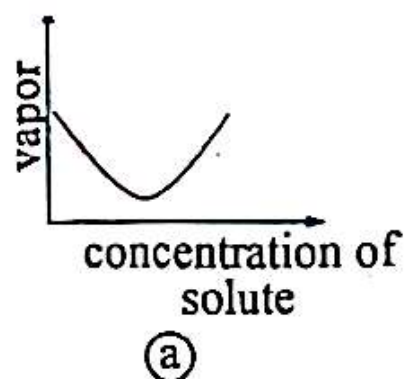
5. **What is the relationship between the number of solute molecules in a solution and its vapor pressure?..**

- a. ☐ Inverse relationship
- b. ☐ Direct relationship
- c. ☐ No relationship
- d. ☐ Variable relationship

6. **What is the relation between the decrease in the vapor pressure of a solution and the number of solute ions in the solution?.....**

- a. ☐ Inverse
- b. ☐ Direct
- c. ☐ Constant
- d. ☐ Increasing then decreasing

7. Which of the following graphs represents the relation between the concentration of solute ions in the solution and the vapor pressure of the liquid?.....



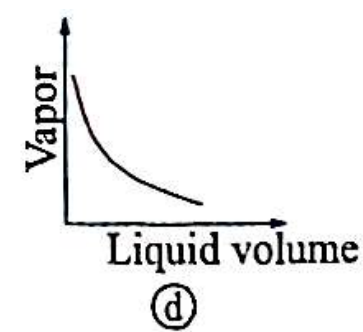
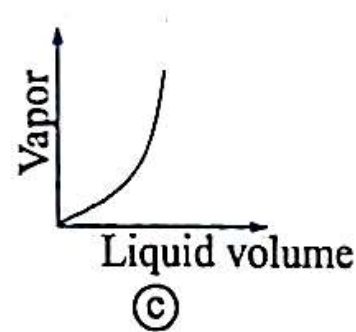
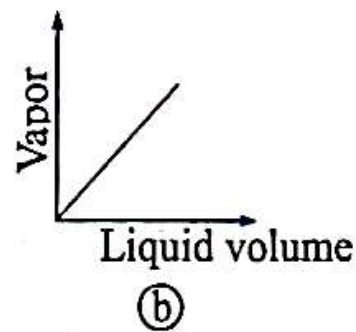
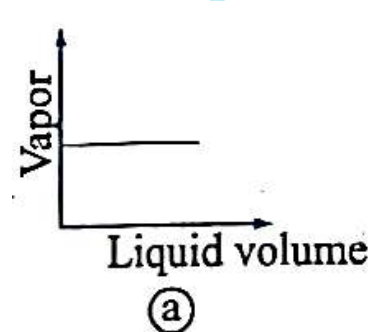
8. What are the consequences of using salt or sugar in preserving some beverages?.....

- a. ☐ Increasing the liquid vapor pressure
- b. ☐ Improving the taste only
- c. ☐ Decreasing the liquid vapor pressure
- d. ☐ Decreasing the liquid boiling point

9. The following solutions have equal concentrations, which of them has the least vapor pressure?.....

- a. ☐ NaCl
- b. ☐ CuCl_2
- c. ☐ $\text{Al}(\text{NO}_3)_3$
- d. ☐ HCl

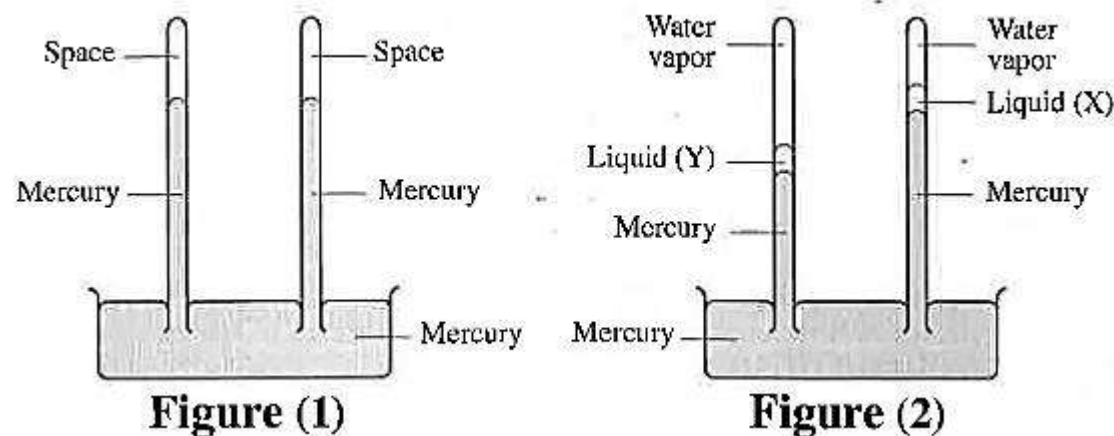
10. Which of the following graphs correctly represents the relation between the volume of a liquid and its vapor pressure at constant temperature?.....



11. What happens to the vapor pressure of a pure liquid in a closed container when the amount of liquid is doubled at the same temperature?.....

- a. ☐ It increases
- b. ☐ It decreases
- c. ☐ It remains constant
- d. ☐ It increases or decreases according to liquid type

12. In the two opposite figures, two solutions (X and Y) of an equal volume were put in two tubes each separately, as the illustrated apparatus in figure (1). Mercury level in the two tubes decreases as in figure (2).



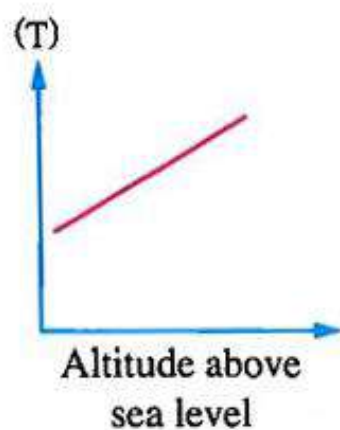
Which of the following is correct?.....

- a. O (X) represents distilled water, (Y) represents NaCl solution
 - b. O (X) represents Nile River, (Y) represents seawater
 - c. O (X) represents NaCl solution, (Y) represents distilled water
 - d. O (X) represents distilled water, (Y) represents ocean water
13. Liquid starts to boil when its vapor pressure is.....
- a. O less than pressure exerted on it
 - b. O greater than pressure exerted on it
 - c. O equal to pressure exerted on it
 - d. O double the pressure exerted on it
14. At standard atmospheric pressure, if the boiling point of a pure solvent = $X^{\circ}\text{C}$, therefore the boiling point of solution formed from dissolving one of its salts in it, is.....
- a. O equal to X
 - b. O larger than X
 - c. O less than X
 - d. O equal to 2

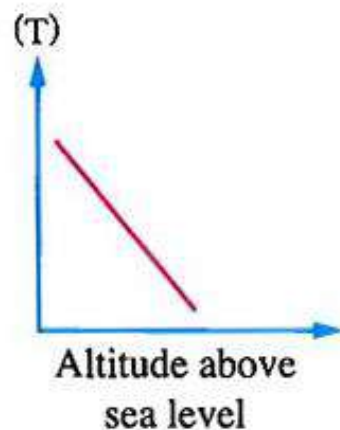
15. At higher altitudes above sea level, which of the following is correct about the boiling point of pure water?..

- a. O It decreases as the atmospheric pressure increases
- b. O It decreases as the atmospheric pressure decreases
- c. O It increases as the atmospheric pressure decreases
- d. O It increases as the atmospheric pressure increases

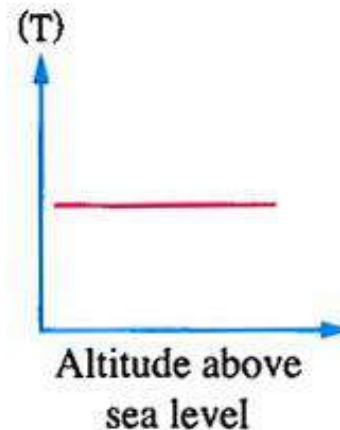
16. Which of the following graphs represents the relation between the boiling point of pure water (T) and the altitude above sea level?.....



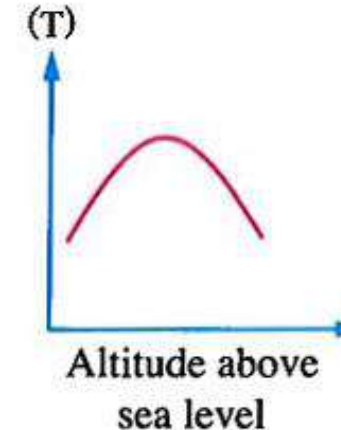
(a)



(b)



(c)



(d)

17. If the boiling point of a solution at a mountaintop is 108°C , therefore the boiling point of the same solution on the Earth's surface is....

a. 106°C

b. 104°C

c. 108°C

d. 110°C

18. Assuming that a liquid boils at 90°C , if it is exposed to high pressure, its boiling point can be.....

a. 82°C

b. 90°C

c. 110°C

d. 70°C

19. The boiling point of pure water inside the pressure-cooking pot may be.....

a. 125°C

b. 90°C

c. 100°C

d. 80°C

20. The boiling point of a liquid inside the pressure-cooking pot is.....its boiling point at atmospheric pressure of 0.5 atm .

a. O greater than

b. O less than

c. O equal to

d. O half

1st Secondary

Integrated Sciences

الفصل الدراسي الأول

الدرس - الخامس -

Biological Importance of Water

- الإختبار -

First : Choose the correct answer :

1. Which of the following describes the structure of prokaryotic cells?.....
 - a. ☐ Simple with two cells
 - b. ☐ Complex with many cells
 - c. ☐ Simple with one cell
 - d. ☐ Simple with three cells
2. A bacterium is classified as a prokaryote, because it-----
 - a. ☐ has cilia
 - b. ☐ has no membrane-bound nucleus
 - c. ☐ is a single cell
 - d. ☐ has no DNA
3. Put the following structures in the order in which are organized in the human body, from smallest to largest?..
(Tissues, cells, organ systems, organs)
 - a. ☐ Cells → organs → tissues → organ systems
 - b. ☐ Cells → tissues → organs → organ systems
 - c. ☐ Tissues → organs → organ systems → cells
 - d. ☐ Organ systems → organs → tissues → cells
4. If the nuclear membrane is removed from a eukaryotic cell, the cell with this feature will resemble that of ...
 - a. ☐ bacteria
 - b. ☐ fungi
 - c. ☐ protists
 - d. ☐ multicellular algae
5. If a living organism has its genetic material is free in the cytoplasm and lacks mitochondria, then this organism is a/an ...
 - a. ☐ prokaryote
 - b. ☐ plant
 - c. ☐ eukaryote
 - d. ☐ animal
6. Fungi and protozoa are similar in that all of them....
 - a. ☐ contain cell wall
 - b. ☐ are heterotrophic
 - c. ☐ are aquatic
 - d. ☐ are unicellular
7. Which of the following is true about the Kingdom Fungi?....
 - a. ☐ Most fungi are heterotrophic
 - b. ☐ Most fungi perform photosynthesis
 - c. ☐ All fungi are multicellular
 - d. ☐ All fungi have a plasma membrane

8. All the following are heterotrophic organisms, except.....

- a. **O** Protozoa b. **O** yeast fungus c. **O** golden algae d. **O** starfish

9. Which of the following organisms is unicellular and does not contain a nuclear membrane?...

- a. **O** Amoeba b. **O** Yeast c. **O** Euglena d. **O** Bacteria

10. All the following are from vertebrates, except.....

- a. **O** fish b. **O** amphibians c. **O** reptiles d. **O** arthropods

11. Which of the following substances determines the shape of the corn plant cell?.....

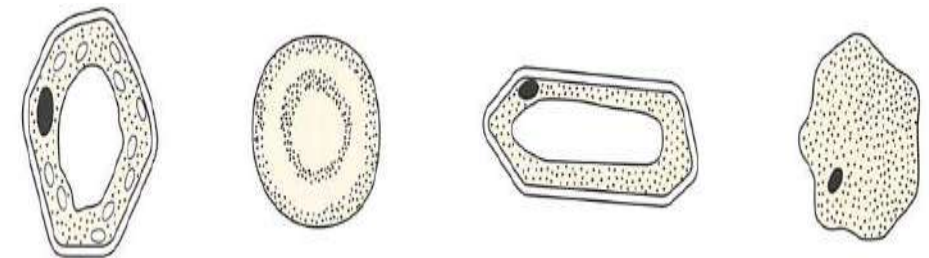
- a. ☐ Peptidoglycan and cellulose
b. ☐ Lipids only
c. ☐ Chitin and protein
d. ☐ Cellulose only

12. Which cell structure plays the primary role in selective permeability?.....

- a. ☐ Chloroplast b. ☐ Plasma membrane c. ☐ Cell wall d. ☐ Mitochondria

13. Which of the following all the cells are similar in its presence?.....

- a. ☐ Cell membrane
b. ☐ Cell wall
c. ☐ Plastids
d. ☐ Nucleus



14. Which of the following structures contains genes?.....

- a. ☐ Plasma membrane of a plant cell
b. ☐ Cytoplasm of an animal cell
c. ☐ Nucleus of a plant cell
d. ☐ Lysosome in an animal cell

15. In which does the nucleus in an animal cell differ from the nucleus in a plant cell?.....

- a. ☐ Its location in the cell
- b. ☐ containing genetic material
- c. ☐ Its structure
- d. ☐ Its function

16. All eukaryotes are similar in containing.....

- a. ☐ large vacuole
- b. ☐ mitochondria
- c. ☐ cell wall
- d. ☐ chloroplasts

17. Which of the following do you expect its/their presence is abundant in the birds' muscular cells?....

- a. ☐ Endoplasmic reticulum
- b. ☐ Plasma membrane
- c. ☐ Mitochondria
- d. ☐ Vacuoles

18. Which of the following are found in both of a human skin cell and a cell of a corn plant leaf?.....

- a. ☐ Nucleus and cytoplasm
- b. ☐ Plasma membrane and large vacuole
- c. ☐ Nucleus and plastid
- d. ☐ Plasma membrane and cell wall

19. What distinguishes a Salmonella cell from a human stomach cell?.....

- a. ☐ The presence of mitochondria
- b. ☐ The presence of a cell membrane
- c. ☐ The presence of a nuclear membrane
- d. ☐ The presence of a cell wall

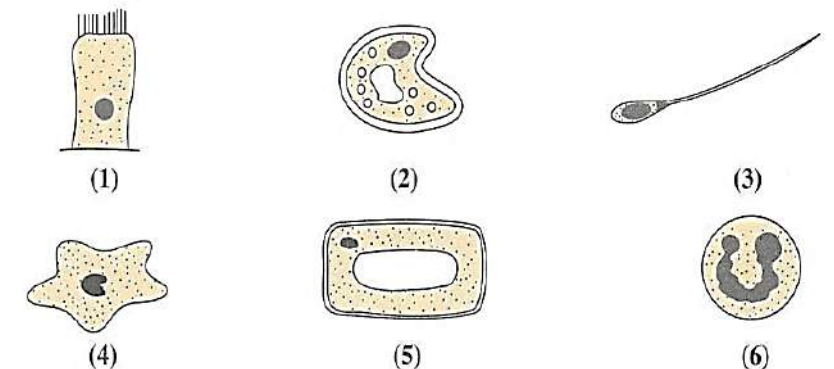
20. Dysfunction of mitochondria in the cell directly leads to ...

- a. ☐ cessation of protein synthesis
- b. ☐ reduction of ATP production
- c. ☐ failure of cell division
- d. ☐ cessation of transpiration maintain

21. The following figures illustrate 6 cells :

Which of the them are plant cells and which of them are animal cells?...

	Plant cells	Animal cells
a.	(2), (3) & (4)	(1), (5) & (6)
b.	(1), (3), (5) & (6)	(2) & (4)
c.	(2) & (5)	(1), (3), (4) & (6)
d.	(1). (4) & (6)	(2), (3) & (5)

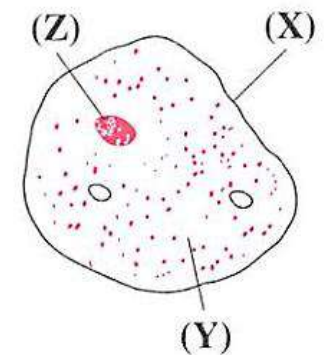


22. A cell has the following molecules and structures: enzymes, DNA, plasma membrane, and mitochondria. It could be a cell from.....

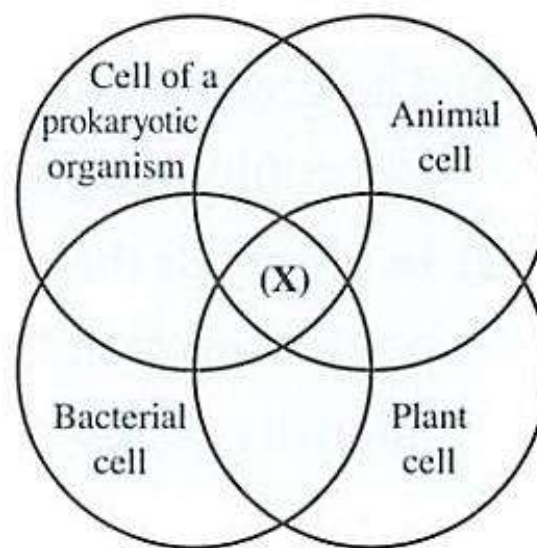
- a. ☐ a bacterium
- b. ☐ an animal, but not a plant
- c. ☐ a plant, but not an animal
- d. ☐ a plant or an animal

23. Which of the following is correct according to structures (X), (Y) and (Z) that are found in the plant cell?.....

	(X)	(Y)	(Z)	✓	Present
a. ☐	✓	✓	✓	✗	Absent
b. ☐	✗	✗	✓		
c. ☐	✓	✓	✗		
d. ☐	✗	✓	✗		



24. The opposite diagram illustrates four different cells.



What is the structure that is represented by symbol (X)?.....

- a. ☐ Cell membrane
- b. ☐ Cell wall
- c. ☐ Chloroplast
- d. ☐ Nuclear membrane

25. The figure in front of you illustrates an animal cell, study it, then answer.

1. Which of the following structures whose number decreases in the plant cell?.....

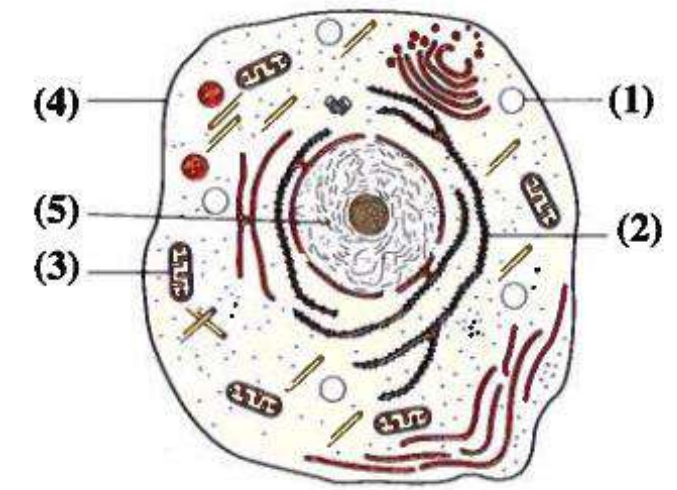
- | | |
|----------|----------|
| a. O (1) | c. O (2) |
| b. O (4) | d. O (5) |

2. Which of the following structures consists of a group of membranes?.....

- | | |
|----------|----------|
| a. O (1) | c. O (3) |
| b. O (2) | d. O (4) |

3. Which of the following structures controls the living cell activities?.....

- | | |
|----------|----------|
| a. O (1) | c. O (3) |
| b. O (2) | d. O (5) |



26. The following figure represents a bacterial cell that lives in liquid media as water and milk, using the flagella illustrated in the figure for movement.

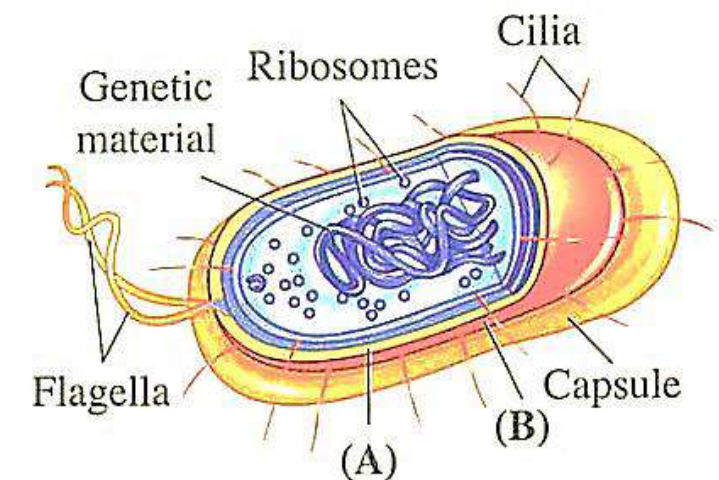
Study it, then answer :

1. What is the function of structure (A)?.....

- a. O It acts on supporting the bacterial cell
- b. O It allows the passage of water and dissolved substances through it easily
- c. O It regulates the passage of substances from and to the cell
- d. O It is found in the bacterial and plant cells only

2. What is the function of structure (B)?.....

- a. O It acts on supporting the bacterial cell
- b. O It allows the passage of water and doesn't allow the passage of dissolved substances through it
- c. O It regulates the passage of substances from and to the cell
- d. O It exists in all the living cells



كيفية طباعة صفحات معينة من ملف معين مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9

